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Creating Artificial Life

Craig Venter Institute builds a Chromosome

Researchers have assembled the entire genome of a living organism–a bacterium–in what they hope is an important step to creating artificial life.

The micro-organism, *Mycoplasma genitalium,* has the smallest known genome of any truly living organism, with 485 working genes. Viruses are smaller, but they are not considered completely alive as they cannot replicate by themselves.

Bacteria can and do, and the team at the non-profit J. Craig Venter Institute in Maryland (U.S.A.) has been working for years to try to build *M. genitalium* from scratch.

"We consider this the second in significant steps of a three-step process in our attempts to make the first synthetic organism," Craig Venter, founder of the Institute, told a telephone briefing in Jan. 2008, "This entire process started with four bottles of chemicals."

M. genitalium has a fairly simple structure–all its DNA is carried on a single chromosome. Chromosomes are the structures that carry genetic material, and the entire code is called the genome. Other genetic material called RNA is needed to convert this gene map into something a cell can use to function.

Writing in the journal *Science,* the researchers said they used first *E. coli* bacterium and then yeast cells to copy pieces of DNA and assemble them into an artificial chromosome.

Next, the researchers say, they want to insert this artificial chromosome into a cell and see if they can make their synthetic chromosome "boot up" the cell.

Researchers hope to eventually make synthetic micro-organisms that could be used for producing biofuels, cleaning up toxic waste, or pulling excess carbon dioxide out of the atmosphere.

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CONTENTS

(Vol. 10, No. 1)

Editorial

On Entering the 10th Year

A decade is considerably long period for a periodical. BIONOTES is happy to touch that threshold. Despite many ups and downs, and with several hopes and mishaps, the journey is continuing. It is time to congratulate all concerned.

First of all let us heartily thank the members of ABC, who have sustained year after year this thin magazine of life sciences in India. They are foremost to get the credit for this success. All the collaborators, Institutions and libraries, advertisers, our printers and correspondents deserve our appreciation for the support they have given. And last but not the least, we thank our past and present office-bearers and the honorary members for sharing responsibilities and encourageing us in various ways. We are indeed obliged to all. Many kudos to the BIONOTES for entering 10th year.

For the first time after 9 years, we have enhanced the subscription rate for Individual members in India from now. Need not say that it is because of increased expenditure on various connected items. We hope the members will bear with it. Please note that rates of Institutional subscribers in India and the foreign rates have not been changed. Besides, reprint charges have also not been enhanced, despite more expenses. In the light of this, we wish more libraries will subscribe to the BIONOTES. Please arrange it for your Institution. We also seek your cooperation to get more and good short research notes for publication.

The last issue of this volume will be a "special". It will be the 40th issue of BIONOTES. We hope to publish it as a "Special Number". Readers are requested to send their significant research papers for this issue.

In the present issue (Vol.10, No.1) a considerably lengthy manuscript has been included. Again it is a first of this kind. It the first time that such a large paper has been published in the BIONOTES in a single issue. We hope to accommodate such larger works now and then in future also. And definitely we will welcome significant big papers on interesting biological aspects for our 40th issue.

Wishing all the best to our readers and members of ABC in the year 2008, once again we seek the blessings, patronage and kind wishes of senior research workers. Please help this tiny flower to blossom. BIONOTES is your periodical.

– RKV.

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Sd/-Dr. R.K. Varshney

Dated the 1st March, 2008. Signature of the publisher

3 Years after Tsunami

The 2004 tsunami destroyed vast areas of South and South-east Asia. The black day was the 26th October 2004. More than 6 lakh people died in the disaster. A general break up is-

India	-	11,000	died
Sri Lanka	-	31,000	died
Thailand	-	8,000	died
Indonesia	-	1,30,000	died

Aceh (Indonesia) was hit the hardest.

In India, Andamans were hit badly. Three years after the black day, the earthquake that caused it is still pushing the land mass. Port Blair has been pushed more than 3 mts. towards Chennai. 7,500 people died in Andaman & Nicobar Islands. Data studied through GPS at 40 sites suggest that the western part of Andamans has tilted up and the eastern gone down. Large swathes of beaches, coconut plantations and coral reefs were destroyed. Land slumped 86 cm. during the earthquake, but had since risen about 26 cm.

Moths recorded from different elevations in Nainital District, Kumaon Himalaya, India

PETER SMETACEK

The Retreat, Jones Estate, P.O. Bhimtal, Nainital - 263 136 (Uttarakhand).

Introduction

The present paper is based on observations carried out over thirty years in the Bhimtal valley (29 degrees 20'40"N 79 degrees 30"16"E) of Nainital district, and for one year at two other nearby locations in the same district, Ranibagh (400 m) and Gagar (2400 m). The intention is to clarify the altitudinal distribution of the moths found in this area, which is the outermost range of the Himalaya in this area.

When the observations began during the 1970s, Bhimtal was a small town with few electric lights. Today, it is a well lit town with several industries, government offices, etc. All of these are splendidly lit up at night. It is no wonder, therefore, that many more moths were attracted to mercury vapour light during the 1970s than are attracted nowadays.

The present paper is based on my collection, as well as material in Collection Hauenstein and Collection Hacker, both in Germany, some specimens in the Natural History Museum, London and in the University Museum, Oxford, U.K.

The localities and elevations are as under:

A = Gagar (2400m)/Maheshkhan (2200m);

B = Jones Estate, Bhimtal (1500m);

C = Ranibagh (450m - 600m).

The list of 887 species is by no means exhaustive, for more than 350 species of moths in my collection await identification. However, there is sufficient material to add considerably to the present knowledge on the subject. Some species included in the present list have been reported in my earlier publications and some by other workers.

Those that are being reported from this area for the first time, which have previously only been recorded from either further east (Sikkim, Nepal) or further west (Himachal Pradesh, Garhwal) have a notation "new record" against their names. This does not include species that were known from both further east and west but had not been recorded from Kumaon proper previously, nor does this include those species whose distribution was noted to be "throughout India" by previous workers. In other words, the 164 new records on this list are cases where the range of the species has been extended further east or west, as the case may be.

Many families of micro-moths have not been included, since I have no means of identifying them. Perhaps these will be identified and published in the years to come.

Systematic List

Order LEPIDOPTERA

Family COSSIDAE

Cossus cadambae Moore	C (new record)
Xyleutes strix Linnaeus	C (new record)
Duomitus leuconotus Walker	B
Zeuzera multistrigata Moore	AB
Zeuzera coffeae Nietner	C (new record)

Family HEPIALIDAE

Palpifer sexnotatus Moore	B
Hepialiscus nepalensis Walker	A
Endoclita Felder species	B

Family LIMACODIDAE

Scopelodes venosa Walker	B (new record)
Scopelodes testacea Butler	B (new record)
Scopelodes unicolor Westwood	C (new record)
Hyphorma minax Walker	B (new record)
Susica himalayana Holloway	B (new record)
Thosea sevastopuloi Cock, Godfray & Holloway	B
Aphendala cana Walker	B
Aphendala tripartita Moore	BC
Phocoderma velutina Kollar	BC
Birthama junctura Walker	C (new record)
Miresa inornata Walker	BC (new record)
Miresa bracteata Butler	B (new record)
Parasa hilaris Westwood	BC
Cania himalayana Holloway	B
Chalcoscelides castaneipars Moore (new record)	AB
Altha subnotata Walker	BC
Demonarosa rufotesselata Moore	B
Atosia himalayana Holloway	B (new record)
Mahanta quadrilinea Moore	AB (new record)

Family THYRIDIDAE

Striglina vialis Moore	B
Striglina scitaria Walker	ABC
Dysodia ignita Walker	B
Rhodoneura myrtaea f. *fenestrata* Moore	B
Camptochilus reticulatum Moore	B (new record)
Herdonia Walker sp.	B (new record)

Family ZYGAENIDAE

Epizygaena cashmirensis Kollar	B
Epizygaena erythrosoma Hampson	A
Brachartona quadrimaculata Moore	A

Artona zebraica Butler B
Lophosoma cupreum Walker B
Tripanophora semihyalina Kollar B
Eterusia leptalina Kollar AB
Pidorus glaucopis Drury B (new record)
Heterusia aedea ssp. *edocla* Doubleday BC (new record)
Chalcosia pectinicornis Linnaeus B
Campylotes histrionicus Westwood AB
Gynautocera papilionaria Guérin-Menéville B (new record)
Histia rhodope Cramer B (new record)
Agalope hyalina Kollar AB
Agalope bifasciata Hope AB
Phauda flammans Walker B

Family EPICOPIDAE

Epicopia polydorus Westwood B

Family PSYCHIDAE

Clania vareigata Snellen A (new record)

Family SPHINGIDAE

Acherontia lachesis Fabricius ABC
Acherontia styx Westwood BC
Agrius convolvuli Linnaeus ABC
Meganoton analis Felder & Felder AB
Psilogramma menephron Cramer BC
Psilogramma increta Walker B
Pseudodolbina fo Walker B
Sphinx ligustri Linnaeus B
Thamnoecha uniformis Butler B
Dolbina inexacta Walker ABC
Ambulyx sericeipennis Butler AB
Ambulyx placida Moore B
Ambulyx maculifera Walker B
Ambulyx liturata Butler BC
Ambulyx ochracea Butler BC
Ambulyx substrigilis Westwood B
Clanis phalaris Cramer B
Clanis deucalion Walker AB
Clanis bilineata Walker AB
Clanis titan Rothschild & Jordan B
Polyptychus trilineatus Moore BC
Marumba cristata Butler B
Marumba spectabilis Butler AB
Marumba dyras Walker B
Marumba sperchius Menétriés AB
Langia zenzeroides Moore B
Clanidopsis exusta Butler AB
Cypa decolor Walker ABC
Cypa pallens Jordan B
Anambulyx elwesi Druce B
Hemaris saundersi Walker B
Cephonodes hylas Linnaeus BC
Cephonodes picus Cramer B
Daphnis hypothous Cramer B
Dahira rubiginosa Moore B
Ampelophaga rubiginosa Bremer & Grey AB
Acosmeryx naga Moore AB
Acosmeryx anceus Stoll BC
Acosmeryx socrates Boisduval BC
Acosmeryx omissa Rothschild & Jordan B
Eupanacra metallica Butler AB
Eupanacra variolosa Walker B
Eupanacra sinuata Rothschild & Jordan B
Eupanacra mydon Walker BC
Nephele didyma Fabricius BC
Gurelca masuriensis Butler B
Hayesiana triopus Westwood B
Macroglossum bombylans Boisduval B
Macroglossum belis Linnaeus B
Macroglossum saga Butler B
Rhopalopsyche nycteris Kollar AB
Hyles livornica Esper B
Deilephila rivularis Boisduval AB
Hippotion celerio Linnaeus B
Hippotion boerhaviae Fabricius B
Theretra nessus Drury ABC
Theretra boisduvali Bugnion BC
Theretra clotho Drury BC
Theretra alecto Linnaeus AB
Theretra oldenlandiae Fabricius ABC
Theretra griseomarginata Hampson BC
Theretra pallicosta Walker B
Rhyncholaba acteus Cramer B
Rhagastis velata Walker ABC
Rhagastis acuta Walker BC
Rhagastis castor Walker B
Rhagastis confusa Rothschild & Jordan AB
Rhagastis olivacea Moore AB
Cechenena mirabilis Butler AB
Cechenena minor Butler B
Cechenena scotti Rothschild AB

Family BOMBYCIDAE

Penicillifera apicalis Walker B
Ernolatia moorei Hutton B
Ocinara albicollis Walker BC
Gunda sikkima Moore C (new record)
Bombyx huttoni Westwood B
Mustilia falcipennis Walker AB (new record)
Mustilia sphingiformis Moore AB
Mustilia hepatica Moore AB

Family BRAHMAEIDAE

Brahmea wallichi Gray A (new record)
Brahmidia hearseyi White B

Family SATURNIIDAE

Actias selene Hübner B

Attacus atlas Linnaeus	AB
Samia cynthia Drury	BC
Anthraea roylei Moore	B
Anthraea assamensis Westwood	B
Dictyoploca simla Westwood	B
Dictyoploca cachara Moore	AB
Loepa katinka Westwood	B
Family EUPTEROTIDAE	
Ganisa postica Walker	BC
Ganisa similis Moore	B
Apona cashmirensis Kollar	AB
Eupterote fabia Cramer	ABC
Eupterote geminata Walker	BC
Family LASIOCAMPIDAE	
Bhima undulosa Walker	B
Suana concolor Walker	BC
Lebeda nobilis Walker	B
Metanastria lidderdalii Butler	B (new record)
Metanastria hyrtaca Cramer	BC (new record)
Arguda flavovittata Moore	AB
Arguda decurtata Moore	B (new record)
Trabala vishnou Lef.	ABC
Estigena pardalis Walker	B
Euthrix laeta Walker	B
Euthrix pyriformis Moore	AB
Paralebeda plagifera Walker	AB
Cyclophragma lineata Moore	B
Gastropacha undulifera Walker	B
Family NOTODONTIDAE	
Tarsolepis fulgurifera Walker	B (new record)
Tarsolepis rufobrunnea Rothschild	B
Dudusa sphingiformis Moore	B
Euhampsonia niveiceps Walker	AB
Phalera parivala Moore	B
Phalera procera Felder & Felder	B
Phalera raya Moore	BC
Phalera grotei Moore	B
Gangarides rosea Walker	BC
Gargetta costigera Walker	B
Turnaca acuta Walker	BC (new record)
Eupydna longivitta Walker	B
Eupydna eupatagia Hampson	A
Ramesa tosta Walker	B
Zaranga gigantea Druce	AB
Zaranga pannosa Moore	B
Fentonia ocypete Bremer	B
Hyperaeschra dentata Hampson	B
Suzukiana basistriga Moore	B
Neostauropus alternus Walker	BC
Stauropus limitaris Ebert	B
Netria viridescens Walker	B
Harpiya microsticta Swinhoe	B
Quadricalcarifera fasciatus Moore	B
Formofentonia orbifer Hampson	A (new record)
Benbowia virescens Moore	BC (new record)
Somera virens Dierl	B
Somera viridifusca Walker	B
Neocerura liturata Walker	ABC
Cerura roesleri de Lattin, Becker & Bender	B (type locality)
Damata longipennis Walker	AB
Chadisra bipars Walker	BC
Neopheosia fasciata Moore	B
Fentonia excurvata Hampson	B
Teleclita strigata Moore	B (new record)
Acmeshachia albifascia Moore	A
Lophopteryx ferruginosa Moore	B
Allata sikkima Moore	BC
Ginshachia gemmifera Moore	A
Spataloides auritractata Moore	B
Rosama plusioides Moore	AB
Clostera pallida Walker	ABC
Clostera restitura Walker	B
Clostera undulata Hampson	B
Cyphanta chortochlora Hampson	A B
Family ARCTIIDAE	
Subfamily SYNTOMINAE	
Caeneressa diaphana Kollar	B
Syntomoides imaon Cramer	BC
Amata bicincta Kollar	B
Amata cyssea Cramer	ABC
Amata georgina Butler	B
Amata musa Swinhoe	C
Trichaeta teneiformis Walker	B
Subfamily ARCTIINAE	
Callindra equitalis Kollar	AB
Callindra nyctemerata Moore	A (new record)
Aglaomorpha plagiata Walker	ABC
Utethesia lotrix Cramer	BC
Nyctemera adversata Schaller	BC
Nyctemera cenis Cramer	B
Nyctemera arctata Walker	BC (new record)
Argina astrea Drury	BC
Mangina argus Kollar	ABC
Pangora distorta Moore	BC (new record)
Areas galactina Van der Hoeven	AB
Areas imperialis Kollar	AB
Alphaea impleta Walker	A (new record)
Alphaea imbuta Walker	B
Nannoarctia obliquifascia Hampson	B
Rajendra perrotteti Guérin-Menéville	BC (new record)
Aloa lactinea Cramer	BC
Creatonotus gangis Linnaeus	BC
Creatonotus transiens Walker	ABC

Cladarctia quadriramosa Kollar	B
Juxtarctia multiguttata Walker	BC
Spilarctia casigneta Kollar	AB
Spilarctia comma Walker	AB
Spilarctia leopardina Kollar	A
Spilarctia neglecta Rothschild	B (new record)
Spilarctia melanostigma Erschoff	B
Spilarctia obliqua Walker	B
Spilarctia erythrozona Kollar	A
Spilarctia sagittifera Moore	B
Lemyra melanosoma Hampson	B
Lemyra rhodophila Walker	AB
Olepa ricini Fabricius	BC
Amerila astreus Drury	BC
Subfamily **LITHOSIINAE**	
Macrobrochis gigas Walker	BC (new record)
Macrobrochis prasena Moore	BC
Macrobrochis pallens Hampson	AB (new record)
Churinga rufifrons Moore	AB
Sidyma albifinis Walker B	
Vamuna remelana Moore	ABC (new record)
Hesudra sericeipennis Moore	B (new record)
Chrysorhabdia viridata Walker	A (new record)
Chrysorhabdia bivitta Walker	AB
Brunia antica Walker	BC (new record)
"Lithosia" nigrifrons Moore	B
"Lithosia" innotata Butler	B
"Lithosia" chrysophleps Hampson	BC (new record)
Mithuna quadriplaga Moore	B (new record)
Eugoa bipunctata Walker	BC (new record)
Sicca taprobanis Walker	ABC
Cyana puella Drury	BC
Cyana bianca Walker	C (new record)
Cyana effracta Walker	B
Cyana adita Moore	AB
Cyana guttifera Walker	B
Cyana detrita Walker	B
Cyana gelida Walker	BC
Cyana bellissima Moore	BC
Cyana gazella Moore	B
Cyana arama Moore	AB
Cyana dohertyi Elwes	BC
Asura undulosa Walker	B
Asura calamaria Moore	BC
Asura dasara Moore	B
Asura conjunctana Walker	B (new record)
Lyclene dharma Moore	B
Barsine linga Moore	B
Barsine gratiosa Guérin-Menéville	ABC
"Barsine" maculifasciata Hampson	B (new record)
"Miltochrista" palmata Moore	B
"Miltochrista" nubifascia Walker	A (new record)
Cacyparis prunifera Swinhoe	B (new record)
Family CALLIDULIDAE	
Callidula erycinoides Walker	A
Pterodecta anchora Moore	AB
Family DREPANIDAE	
Macrocilix mysticata Walker	AB
Macrauzata fenestraria Moore	A
Auzata semipavonaria Walker	AB
Ditrigona triangularia Moore	B (new record)
Teldenia vestigiata Butler	BC
Leucodrepana Hampson species	AB
Drepana pallida Moore	AB
Depana innotata Hampson	B
Paralbara perhamata Hampson	AB (new record)
Albara violacea Butler	AB
Albara lilacina Moore	AB
Callidrepana argenteola Moore	B
Tridrepana flava Moore	ABC
Tridrepana albonotata Moore	B
"Drepana" hyalinata Moore	AB (new record)
Deroca hyalina Walker	AB
Deroca inconclusa Walker	B
Oreta extensa Walker	B
Oreta sanguinea Moore	A (new record)
Oreta obtusa Walker	A
Subfamily CYCLIDIINAE	
Cyclidia substigmaria Hübner	BC
Subfamily THYATIRINAE	
Thyatira batis Linnaeus	AB
Tethea oberthueri Houlbert	A (new record)
Palimpsestes albicosta Moore	AB
Habrosyne fraterna Moore	A
Polyploca orbicularis Moore	B
Family URANIIDAE	
Subfamily URANIINAE	
Lyssa zampa Butler	B (new record)
Subfamily MICRONIINAE	
Acropteris striataria Clerck	B (new record)
Pseudomicronia aculeata Guenée	B
Subfamily EPIPLEMINAE	
Orudiza protheclaria Walker	C (new record)
Dysaethria reticulata Moore	B
Dysaethria himalayica Smetacek	AB
Dysaethria rhagavata Walker	B
Dysaethria ruptaria Moore	BC
Dysaethria fulvilinea Hampson	C (new record)
Sylviplema bicaudata Moore	B
Somwaria restricta Hampson	B
Pangteyia ocusta Swinhoe	B
Himaplema pectinicornis Dudgeon	BC
Phazaca theclata Guenée	B
Phazaca leucocera Hampson	B

Monobolodes simulans Butler AB
Warreniplema fumicosta Warren ABC

Family GEOMETRIDAE

Subfamily DESMOBATHRINAE

Palaeomystis falcataria Moore A (new record)
Eumelea rosalia Stoll BC (new record)
Conolophia nigripuncta Hampson BC (new record)

Subfamily GEOMETRINAE

Dysphania militaris Linnaeus BC (new record)
Herochroma cristata Warren ABC (new record)
Herochroma ochreipicta Swinhoe AB
Pingasa ruginaria Guenée B
Pingasa pseudoterpnaria Guenée AB
Pingasa alba Swinhoe B (new record)
Pingasa differens Warren AB (new record)
Pachyodes ornataria Moore AB (new record)
Lophophlema luteipes Felder & Rogenhofer B
Lophophlema funebrosa Warren AB (new record)
Dindica polyphaenaria Guenée B
Tanaorrhinus reciprocata Walker ABC
Aporandria specularia Guenée C (new record)
Hipparchus flavifrontaria Guenée ABC
Hipparchus vallata Butler B
Hipparchus variegata Butler AB
Chlororithra fea Butler A (new record)
Omphacodes directa Walker BC
Neromia carnifrons Butler ABC (new record)
Mixochlora vittata Moore B
Agathia lycaenaria Kollar BC
Agathia hilarata Guenée B
Agathia hemithearia Guenée B (new record)
Mixolophia ochrolauta Warren B
Hemithea aquamarina Hampson ABC
Hemithea tritonaria Walker B (new record)
Hemithea distinctaria Walker B
Hemithea costipunctata Moore B
Ornithospila avicularia Guenée BC
Eucyclodes gavissima Walker B
Eucyclodes Warren (*divapala* Walker group) BC
Spaniocentra lyra Swinhoe B (new record)
Comibaena fuscidorsata Prout BC
Comibaena subhyalina Warren A
Episothalma robustaria Guenée BC (new record)
Thalassodes veraria Guenée ABC
Thalassodes goniaria Felder BC
Osteosema sanguilineata Moore B (new record)
Uliocnemis castalaria Oberthur BC (new record)
Hemistola rectilinea Warren B (new record)
Chlorissa gelida Butler B (new record)
Hemistola detracta Walker B
Hemistola loxiaria Guenée B
Diplodesma planata Prout B
Jodis irregularis Warren AB
Jodis thetydaria Guenée BC (new record)
Jodis undularia Hampson B
Iotaphora iridicolor Butler A (new record)
Comostola subtiliaria Bremer B (new record)
Comostola hauensteini Smetacek B

Subfamily STERRHINAE

Sterrha persimilis Warren B
Timandra correspondens Hampson AB (new record)
Traminda mundissima Walker BC
Somatina purpurascens Moore B
Ptochophyle togata deviaria Walker AB (new record)
Cambogia phoenicosoma Swinhoe B (new record)
Chrysocraspeda iole Swinhoe B (new record)
Problepsis vulgaris Butler BC
Problepsis delphiaria Guenée B
Rhodostrophia stigmatica Butler B
Rhodostrophia tristrigalis Butler B
Rodostrophia meonaria Guenée A
Organopoda carnearia Walker B (new record)
Anisodes absconditaria Walker B (new record)

Subfamily LARENTIINAE

Trichopterigia decorata Moore B (new record)
Trichopterigia sanguinipunctata Warren B (new record)
Phthonoloba decussata Moore B (new record)
Asthena plurilinearia Moore A
Hydatocapnia marginata Warren B
Rhodometra sacraria Linnaeus B
Eupithecia rajata Guenée B
Ecliptopera triangulifera Moore B
Ecliptopera relata Butler A
Ecliptopera decurrens Moore A
Ecliptopera lucrosa Prout B (new record)
Ecliptopera delecta Butler B (new record)
Ecliptopera dentifera Moore B
Hysterura multifaria Swinhoe A
Photoscotosia miniosata Walker B
Electrophaes niveonotata Warren B (new record)
Electrophaes aliena Butler B
Cidaria homophana Hampson (new record) B
Ecliptopera fulvotincta Hampson B
Docirava aequilineata Walker B
Ortholitha latifusata Walker (new record) B
Craspediopsis bimaculata Warren B (new record)
Lobogonodes multistriata Butler AB

Subfamily ENNOMINAE

Urapteryx sciticaudaria Walker B (new record)
Urapteryx ebuleata Guenée AB
Urapteryx clara Butler BC
Thinopteryx crocoptera Kollar BC
Thinopteryx nebulosa Butler BC
Lomographa deletaria Moore ABC

Lomographa distans Warren AB
Nothomiza dentisignata Moore C
Plutodes costatus Butler AB
Plutodes transmutata Walker B
Scardamia metallaria Guenée B
Peratophyga hyalinata Moore ABC
Heterostegane subtessellata Walker BC
Synegia camptogrammaria Guenée B
Hypochrosis pachiaria Walker B
Hypochrosis hyadaria Guenée B
Achrosis incitata Walker C
Eurymene inustata Moore A (new record)
Plagodes reticulata Warren B
Anonychia grisea Butler AB
Heterolocha phaenicotaeniata Kollar B
Heterolocha falconaria Walker A
Heterolocha patalata Felder B (new record)
Pseudopanthera himalayica Kollar AB
Stenorumia ablunata Guenée AB
Opisthograptis luteolata Linnaeus A (new record)
Opisthograptis moelleri Warren AB (new record)
Corymica arnearia Walker BC
Corymica deducta Walker BC
Corymica specularia Moore BC
Callerinnys obliquilinea Moore B (new record)
Nadagara inordinata Walker (new record) B
Luxiaria phyllosaria Walker C (new record)
Luxiaria amasa Butler B
Luxiaria acutaria Snellen B (new record)
Zamarada scriptifasciata Walker BC (new record)
Krananda semihyalina Moore B
Krananda oliveomarginata Swinhoe B (new record)
Zeheba lucidata Walker BC (new record)
Godonela frugaliata Guenée AB
Godonela pluviata Fabricius B
Godonela fuscomarginata Warren B
Godonela emersaria Walker B
Godonela eleonora Cramer BC
Godonela xanthonora Walker B (new record)
Godonela effusata Guenée B
Godonela perfusaria Walker B
Oxymacaria temeraria Swinhoe B
Orsonoba clelia Cramer B
Hyposidra talaca Walker BC
Hyposidra violescens Hampson BC (new record)
Leptestes circumflexa Kollar AB
Petelia distracta Walker BC
Hypephyra terrosa Butler AB
Hyperythra lutea Cramer C
Anthyperythra hermearia Swinhoe B (new record)
Petrodava phoenix Swinhoe BC
Psyra spurcataria Walker AB
Psyra angulifera Walker A
Psyra cuneata Walker B
Fascellina chromataria Walker BC (new record)
Fascellina plagiata Walker ABC
Leptomiza calcearia Walker ABC
Gonodontis angularia Moore B (new record)
Garaeus discolor Warren B
Garaeus apicatus Moore AB
Garaeus argillaceus Butler B
Mimomiza cruentaria Moore AB
Dalima patularia Walker BC
Amblychia angeronaria Guenée BC (new record)
Biston regalis Moore B
Biston bengaliaria Guenée B (new record)
Biston cognataria Guenée B
Biston suppressaria Guenée BC
Elphos pardicelata Walker A
Xandrames sericea Butler AB
Gnophus accipitrarius Guenée AB
Gnophus eolarius Guenée B
Opthalmitis herbidaria Guenée BC
Boarmia ochrifasciata Moore ABC
Ectropis crepiscularia Hübner ABC
Cleora selenaria Hübner BC
Satoblepharia nepalensis Sato BC (new record)
Alcis vareigata Moore ABC (new record)
Alcis decussata Moore A
Alcis semiclarata Walker AB
Racotis boarmiaria Guenée B (new record)
"Boarmia" semialba Moore B
"Boarmia" nigridorsaria Guenée B
"Boarmia" admissaria Guenée B
Hypomecis cineracea Moore C (new record)
Hypomecis transcissa Walker B
Hypomecis infixaria Walker B (new record)
Dasyboarmia subpilosa Warren BC (new record)
"Boarmia" albifera Moore B (new record)
"Boarmia" granitaria Moore B
Ceruncina subplagiata Walker B
"Boarmia" atrilineata Butler B
Abaciscus tristis Butler AB
Gasterocome pannosaria Moore AB
Medasina parisnattei Walker B (new record)
Medasina albidaria Walker B
Arichanna transfasciata Warren AB (new record)
Arichanna marginata Warren AB
Erebomorpha fulgurita Walker AB (new record)
Heterabraxas spontaneata Walker B (new record)
Abraxas sylvata Scopoli ABC
Percnia celluaria Guenée BC (new record)

Family NOCTUIDAE

Subfamily TRIFINAE sensu Hampson 1894

Xanthia albosignata Moore B
Elusa bipars Moore B (new record)

Elusa antennata Moore B (new record)

Subfamily NOCTUINAE

Euxoa hyperythra Boursin B (coll. H.Hacker)
Agrotis biconica Kollar AB
Agrotis segetum Denis & Schiffermueller AB
Agrotis ipsilon Hufnagel AB
Agrotis fraterna Moore A
Ochropleura flammatra Fabricius B
Ochropleura triangularis Moore AB
Ochropleura flammatra Fabricius B
Axylia putris triseriata Moore A
Axylia sicca Guenée B
Diarsia erubescens Butler B
Diarsia nigrosigna Moore A
Peridroma saucia Hübner B
Xestia c-nigrum Linnaeus AB
Xestia consanguinea Moore A
Xestia renalis Moore A
Xestia semiherbida Walker AB

Subfamily HADENINAE

Polytela gloriosae Fabricius B
Siderides submarginalis Walker AB
Siderides costigerodes Poole B
Brithys crini Fabricius B
Arcilasisa sobria Walker B
Tiracola plagiata Walker ABC (new record)
Mythimna decissima Walker B (new record)
Mythimna reversa Moore B
Mythimna l-album Linnaeus B
Mythimna obscura Moore AB
Mythimna distincta Moore AB
Mythimna exanthemata Moore B
Mythimna ignita Hampson B (coll. H. Hacker)
Mythimna percisa Moore AB
Mythimna fragilis Butler B
Mythimna byssina Swinhoe B
Mythimna sinuosa Moore AB
Mythimna dharma Moore A
Mythimna roseilinea Walker B
Mythimna consanguis Guenée ABC
Mythimna fasciata Moore B
Mythimna formosana Butler AB
Mythimna intertexta Chang B (coll. H. Hacker)
Mythimna toreyi Duponchel B
Mythimna separata Walker AB
Mythimna pallidicosta Hampson B

Subfamily CUCULLIINAE

Cucullia albipennis Hampson B
Bornolis flavistigma Moore B
Bornolis niveiplaga Walker B
Cymatophoropsis sinuata Moore B
Diptherocome discibrunnea Moore A
Nacna splendens Moore AB
Thalatha sinens Walker AB
Thalathoides conjecturalis Swinhoe B (new record)
Acronicta indica Moore B
Acronicta pruinosa Guenée B
Craniophora harmandi Poujade B (coll. H. Hacker)

Subfamily AMPHIPYRINAE

Amphipyra monolitha Guenée A
Callyna jugaria Walker BC
Callyna monoleuca Walker BC
Karana gemmifera Walker AB
Trachea auriplena Walker AB
Euplexia distorta Moore A
Euplexia albovittata Moore AB
Pareuplexia metallica Walker AB (new record)
Xenotrachea albidisca Moore AB
Xenotrachea chrysochlora Hampson B
Callopistria latreillei Duponchel AB
Callopistria rivularis Walker B
Callopistria maillardi Guenée B
Callopistria pulchrilinea Walker B
Callopistria repleta Walker AB
Chytonix albipuncta Hampson B
Conservula indica Moore AB
Eutamsia siderifera Moore B
Eutamsia confundens Walker B
Eutamsia opposita Walker B
Sasunaga tenebrosa Moore B
Actinotia intermedia Bremer B
Auchmis inextricata Moore ABC
Hygrostola robusta Hampson A
Spodoptera exigua Hübner AB
Spodoptera litura Fabricius AB
Spodoptera mauritia Boisduval B
Spodoptera cilium Guenée B
Perigea apicea Guenée B
Condica conducta Walker AB
Condica capensis Guenée AB
Condica albigutta Wileman B
Chasmina candida Walker ABC
Chasmina cygnus Walker BC (new record)
Chasmina judicata Walker BC (new record)
"Dysmilichia" calamistrata Moore B
Elaphria conjugata Moore B

Subfamily HELIOTHINAE

Helicoverpa armigera Hübner ABC
Helicoverpa assulta Guenée B
Pyrrhia umbra Hufnagel ABC
Masalia tosta Moore B
Masalia artaxoides Moore B
Masalia bimaculata Moore B

Adisura atkinsoni Moore	B
Subfamily ACONTIINAE	
Eublemma ostrina Hübner	B
Eublemma dimidialis Fabricius	B
Maliattha vialis Moore	B
Maliattha separata Walker	B
Maliattha signifera Walker	B
Maliattha tegulata Butler	B
Ozarba punctigera Walker	B
Ozarba illosis Hampson	B
Cretonia vegetus Swinhoe	B
"Eustrotia" marginata Walker	B
Oruza divisa Walker	BC
Lophoruza diversalis Walker	B
Amyna octo Guenée	B
Amyna punctum Fabricius	B
Subfamily SARROTHRIPINAE	
Blenina quinaria Moore	AB
Blenina accipiens Walker	A
Hyblaea puera Cramer	ABC
Lamprothripa orbifera Hampson	B
Bryophilina mollicula Graeser	B
Nanaguna breviscula Walker	AB
Risoba prominens Moore	AB
Risoba diversipennis Walker	B
Risoba literata Moore	B (new record)
Subfamily CHLOEPHORINAE	
Earias cupreoviridis Walker	B
Earias insulana Boisduval	B
Earias biplaga Walker	AB
Tympanistes rubidorsalis Moore	B
Tympanistes pallida Moore	AB
Tyana pustulifera Walker	ABC
Tyana chloroleuca Walker	B
Gabala roseoretis Kobes	B
Siglophora ferreilutea Hampson	B
Siglophora sanguinolenta Moore	B
Negeta signata Walker	B
Pterogonia episcopalis Swinhoe	B
Xanthodes albago Fabricius	B
Xanthodes intersepta Guenée	B
Xanthodes transversa Guenée	B
Carea angulata Fabricius	ABC
Maurilia iconica Walker	B
Churia ocellata Butler	B
Westermannia triangularis Moore	B
Westermannia superba Hübner	B
Westermannia naessigi Kobes	B
Subfamily EUTELIINAE	
Eutelia adulatricoides indica Mell	B
Paectes subapicalis Walker	AB
Targalla delatrix Guenée	B
Targalla sugii Holloway	B
Anigraea albomaculata Hampson	B (new record)
Penicillaria jocosatrix Guenée	B
Penicillaria maculata Butler	B
Eutelia inextricata Moore	B
Anuga constricta Guenée	B (new record)
Aplotelia diplographa Hampson	B
Chlumetria transversa Walker	A
Subfamily STICTOPTERINAE	
Lophoptera illucida Walker	ABC
Lophoptera squammigera Guenée	AB
Lophoptera longipennis Moore	ABC (new record)
Odontodes aleuca Guenée	B
Subfamily PANTHEINAE	
Trisuloides sericea Butler	AB
Trisuliodes caerulea Butler	A
Trisula vareigata Moore	BC
Tichosea obsolescens Hampson	AB
Baorisa hieroglyphica Moore	B (new record)
Subfamily AGARISTINAE	
Sarbanissa transiens Walker	ABC
Sarbanissa albifascia Walker	C (new record)
Episteme adulatrix Kollar	B
Episteme maculatrix Westwood	B (new record)
Mimeusemia peshwa Moore	B
Subfamily PLUSIINAE	
Abrostola anophioides Moore	B
Abrostola suisharyonis robertsi Dufay	B
Autographa nigrisigna Walker	B
Trichoplusia orichalcea Fabricius	ABC
Trichoplusia intermixta Warren	B
Trichoplusia ni Hübner	B
Trichoplusia obtusisigna Walker	B
Trichoplusia daubei Boisduval	B
Trichoplusia lectula Walker	B
Ctenoplusia kosemponensis Strand	B
Macdunnoughia tetragona Walker	B
Anadevidia hebetata Butler	AB
Anadevidia peponis Fabricius	A
Zonoplusia ochreata Walker	B
Erythroplusia pyropia Butler	B
Agrapha albostriata Bremer & Grey	B
Agrapha furcifera Walker	B
Agrapha tarassota Hampson	AB
Agrapha placida Moore	AB
Sclerogenia jessica Butler	A
Antoculeora ornatissima Walker	A
Chrysodeixia acuta Walker	B
Chrysodeixia eriosoma Doubleday	AB

Chrysodeixia chalcites Esper	AB
Subfamily CATOCALINAE	
Catocala tapestrina Moore	B
Catocala dotatoides Poole	B
Catocala prolifica Walker	B
Catocala macula Hampson	B (new record)
Ophiusa tirhaca Cramer	ABC
Ophiusa triphaenoides Walker	ABC
Ophiusa olista Swinhoe	AB
Artena dotata Fabricius	AB
Thyas honesta Hübner	B
Thyas juno Dalman	AB
Thyas coronata Fabricius	BC
Macaldenia palumba Guenée	BC
Bastilla maturescens Walker	B (new record)
Bastilla crameri Moore	AC
Bastilla praetermissa Warren	BC
"Parallelia" arctotaenia Guenée	B
Dysgonia torrida Guenée	AB
Dysgonia latifascia Warren	AB
Bastilla arcuata Moore	B
Bastilla joviana Stoll	BC
Bastilla amygdalis Moore	B
Bastilla analis Guenée	AB
Bastilla acuta Moore	C (new record)
Erebus albicinctus Kollar	AB
Erebus ephesperis Hübner	BC
Erebus macrops Linnaeus	B
Erebus caprimulgus Fabricius	BC
Erebus hieroglyphica Drury	BC
Anisoneura aluco Fabricius	B
Arcte caerulea Guenée	AB
Hypopyra vespertilio Fabricius	BC
Entomogramma torsa Guenée	BC
Entomogramma fautrix Guenée	B
Serrodes campana Guenée	B
Spirama triloba Guenée	ABC
Spirama retorta Cramer	ABC
Achaea janata Linnaeus	AB
Mocis discios Kollar	AB
Mocis undata Fabricius	ABC
Grammodes geometrica Fabricius	B
Trigonodes hyppasia Cramer	ABC
Prodotis stolida Fabricius	A
Attatha ino Drury	BC
Remgia frugalis Fabricius	AB
Ercheia cyllaria Cramer	B
Alamis umbrina Guenée	B
Lyncestis amphix Cramer	BC
Hamodes propitia Guérin-Menéville	BC
Anticarsia irrotata Fabricius	B
Oxyodes scrobiculata Fabricius	B
Ischyja manlia Cramer	BC
Ischyja inferna Swinhoe	B
Eudocima homaena Hübner	BC
Eudocima phalonia Linnaeus	B
Eudocima materna Linnaeus	B
Eudocima salaminia Cramer	B
Adrus tyrannus Guenée	B
Pleurona falcata Walker	BC
Homaea clathrum Guenée	BC
Fodina stola Guenée	BC
Fodina pallula Guenée	BC
Fodina cuneigera Butler	BC
Calyptra bicolor Moore	AB
Calyptra ophideroides Guenée	AB
Calyptra fasciata Moore	BC
Oraesia rectistria Guenée	BC
Oraesia emarginata Fabricius	BC
Hypocala rostrata Fabricius	ABC
Hypocala moorei Butler	B
Hypocala subsatura Guenée	AB
Belciana biformis Walker	B
Belciana tetraspila Walker	B
Chrysopera combinans Walker	B
Aedia leucomelas Linnaeus	ABC
Donda eurychlora Walker	B
Ericeia inangulata Guenée	B
Ericeia pertendens Walker	B
Blasticorhinus rivulosa Walker	B
Dierna strigata Moore	ABC
Sypna omicronigera Guenée	B
Sypna constellata Moore	A
Sypnoides cyanivitta Moore	B
Sypnoides mandarina Leech	B
Hypersypnoides submarginata Walker	AB
Daddala lucilla Butler	B
Erygia apicalis Guenée	AB
Spiredonia alix Guenée	B
Avitta fasciosa Moore	AB
Pandesma robusta Walker	B
Psimada quadripennis Walker	BC
Cosmophila flava Fabricius	B
Gonitis mesogona Walker	B
Gonitis involuta Walker	B
Anomis figlina Butler	B
Rusicada combinans Walker	B
Rusicada fulvida Guenée	B
Rusicada albitibia Walker	C (new record)
"Anomis" discisigna Hampson	B (new record)
Capotena truncata Walker	BC (new record)
Plusiodonta coelonota Kollar	B
Hepatica anceps Staudinger	B
Attonda trifasciata Moore	BC (new record)
Pangrapta ornata Leech	B

Plecoptera reflexa Guenée AB
Acantholipes trajectus Walker C (new record)
Bocula microspila Holloway BC
Calesia dasypterus Kollar ABC
Calesia haemorrhoa Guenée BC
Episparis liturata Fabricius BC
Pseudosphetta moorei Cotes & Swinhoe B (new record)
Raparna transversa Moore B
Tinolius quadrimaculatus Walker C (new record)
Zethes inornata Walker AB (new record)

Subfamily HERMINIINAE

Adrapsa ereboides Walker B
Adrapsa rivulata Leech B
Simplicia robustalis Guenée B
Simplicia marginata Moore B (new record)
Pseudaglossa fulvipicta Butler B
Mastigophorus brontesalis Walker A (new record)
Progonia kurosawai Owada B
Polypogon vermiculata Leech B

Subfamily HYPENINAE

Perciana marmorea Walker AB
Hypena amica Butler AB
Hypena trigonalis Guenée AB
Hypena triplicalis Walker B (new record)
Hypena quadralis Walker AB
Hypena iconicalis Walker B
Hypena laceratalis Walker B
Hypena melanica Sugi B
Hypena tatorhina Butler B
Hypena rhombalis Guenée AB
Hypena indicatalis Walker A
Hypena albopunctalis Leech B
Rhynchina striga Felder & Rogenhofer AB
Rhynchina abductalis Walker B
Rhynchina angulata Walker B
Rhynchina sigillata Butler B (new record)
Orthozona quadrilineata Moore A (new record)

Subfamily AGANAINAE

Asota tortuosa Moore AB (new record)
Asota caricae Fabricius ABC
Aganais ficus Fabricius BC
Digama hearseyana Moore ABC

Subfamily LYMANTRIINAE

Calliteara grotei Moore B
Calliteara angulata Walker B (new record)
Calliteara strigata Moore A
Dasychira inclusa Walker BC
Mardara caligramma Walker AB
Orgyia proximans Fabricius AB
Orgyia postica Walker B (new record)
Laelia exclamationis Kollar AB
Laelia atestacea Hampson B
Redoa comma Hutton BC
Leucoma subvitrea Walker AB (new record)
Leucoma divisa Walker B
Numenes patrana Moore AB
Lymantria albolunulata Moore AC
Lymantria obfuscata Walker B
Lymantria mathura Moore BC
Lymantria concolor superans Walker AB
Lymantria todara Moore C (new record)
Lymantria obsoleta Walker B
Lymantria marginata Walker BC
Lymantria semicincta Walker A(straggler), BC
Himala argentea Walker B
Gazalina chrysolopha Kollar AB
Perina pura Walker B
Euproctis latifascia Walker AB
Euproctis divisa Walker B (new record)
Euproctis bimaculata Walker BC
Euproctis lunata Walker C
Euproctis inconcisa Walker A (new record)
Euproctis sulphurescens Moore B (new record)
Euproctis anguligera Butler ABC
Euproctis vitellina Kollar AB
Euproctis guttata Walker BC
Euproctis plana Walker B
Euproctis plagiata Walker BC
Euproctis madana Moore B
Euproctis varia Walker B
Euproctis marginata Moore A (new record)
Euproctis albodentata Moore BC
Euproctis magna Swinhoe BC

Family PYRALIDAE

Brihaspa atrostigmella Moore B (new record)
Schoenobius bipunctifer Walker B
Macalla derogatella Walker B
Endotricha mesenterialis Walker B
Vitessa suradeva Moore B (new record)
Hyboloma nummosalis Rag. B (new record)
Toccolosida rubriceps Walker AB (new record)
Sacada sikkima Moore AB (new record)
Orybina flaviplaga Walker B
Stegothyris diagonalis Guenée B
Hyaloplaga pulchralis Moore B (new record)
Zinckenia fascialis Cramer B
Dichocrocis punctiferalis Guenée B
Dichocrocis nigrilinealis Walker B
Dichocrocis definita Butler B
Botyodes asialis Guenée B
Agathodes ostentalis Huebner BC
Glyphodes bivitralis Guenée B (new record)

Glyphodes indica Saund.	B
Pygospila tyres Cramer	ABC
Polythlipta cerealis Led.	B
Lepyrodes neptis Cramer	B
Terastia egialealis Walker	BC
Heliothela ophideresana Walker	B

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New Publications

Book Review

Alkali Wastelands Environment and Reclamation, by I.C. Gupta, S.K. Gupta and D.P. Sharma. 2007. ca 400 pp. Price - Rs. 1295.00. Published by MD Publications Pvt Ltd., 11 Darya Ganj, New Delhi - 110002. ISBN: 978-81-7533-100-6.

In the next two decades, population of India is likely to cross 1.4 billion mark. With additional burden on food grains consumption and demographic shift from rural to urban centers and change in food habits, India need to produce about 325 million tons of food grains by 2027. Since the competing demands from other sectors of economy for the inelastic land resource are multiplying fast, the best agricultural lands are being encroached upon by these sectors. Thus, any further increase in food grains has to come from either vertical increase in productivity or through reclamation of so called wastelands. Out of 8.5 million ha of salt affected lands, alkali lands assessed at 3.8 million ha could be easily managed and reclaimed resulting in an additional food grains production of about 30 million tons.

Although researches on land reclamation began even before independence, yet the real fillip in inderstanding the alkali wastelands environment and development of reclamation and management packages came after the establishment of CSSRI, Karnal, in the year 1969. In association with this Institute, many State Agricultural Universities reoriented their research and came out with theories of alkali land reclamation and developed reclamation and management packages. Favorable policy support from central and state governments helped to reclaim more than 1.3 million ha of alkali lands. To tide over the current and emerging challenges such as to take care of resource poor regions and farmers, environmental degradation and location specific nature of the problems, these packages are being upgraded and new packages are being developed. These new technologies are emerging fast and it is almost impossible to keep track of these developments through published research papers. This book encompasses the latest information on this subject for most states of India, where problems of alkali lands exists. It has been proposed to include all aspects of reclamation and management so that there are at least few alternatives to choose from. Therefore, the compiled information will be handy to post-graduate students, teachers, researchers, extention personnel and the staff in conventional departments such as agriculture and irrigation. Moreover, planners entrusted with the task of development of wastelands in India would be immensely benefited from the information included in this book.

There are a total of 12 Chapters in the book, as follows: 1. Historical Developments, 2. Sampling and Laboratory Investigations, 3. Nature and Properties, 4. Land Development & Leaching, 5. Drainage Methods, 6. Chemical Amendments, 7. Agronomic and Cultural Practices, 8. Irrigation Practices, 9. Alkali Tolerance of Plants, 10. Post Reclamation Behaviour, 11. Alternate Land Use, and 12. Socio-Economic Criteria.

-RKV

Research Notes

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The Harike wetland is located at latitude 31° 25'73" and longitude 75°00' 00", with an area of 41 sq km., at an altitude of 218.83m above msl in three districts of Punjab, i.e. Amritsar, Ferozepur and Kapurthala. There are three Ramsar sites of international importance in Punjab, namely Ropar, Kanjali and Harike, out of the 25 in India. Harike wetland came into existence in 1952, after the construction of a barrage on the confluence of River Beas and Satluj. It was declared a Ramsar site in 1990. It is triangular in shape, and a source of irrigation and drinking water. The lake supports good diversity of ichthyofauna. The livelihood of nearby villagers depends upon the fish resources of the wetland. The commercially important fishes are *Catla catla, Channa punctatus, Channa marulius, Labeo rohita, Labeo calbasu, Cirrhinus mrigala, Aorichthys seenghala, Cyprinus carpio, Heteropneustes fossilis, Wallago attu, Notopterus notopterus, Notopterus chitala, Rita rita,* etc.

The pertinent literature reveals 116 species from Punjab (Johal & Tandon, 1979, 1980). The fish fauna in particular of Harike wetland has been compiled by Ladhar et al. (1994), Dhillon et al. (1996), Dua & Parkash (2005) and Brraich & Ladhar (2005). The last two reported occurrence of *Schizothorax richardsonii* (Gray), *Garra gotyla gotyla* (Gray) and *Glyptothorax punjabensis* Mirza & Kashmiri. According to the present studies, however, these 3 species are purely hill stream fishes and their occurrence in the lake is not ascertained.

Ctenopharyngodon idella, Hypothalmichthys molitrix, Cyprinus carpio and *Gambusia affinis* are exotic fishes in the Harike wetland. These fishes were introduced in the lake for control of aquatic weeds and mosquito larvae. The introduction of these exotic fishes has declined the catches of Indian major carps and is a threat to the indigenous fauna.

The lake has shallow marshy patches, which is the preferable habitat for breeding of fishes. The important aquatic vegetation include *Eichhornia crassipes, Hydrilla verticillata, Lemna minor, Ipomoea aquatica, Najas minor, Nelumbo nucifera, Potamogeton natanus, Sagittaria trifolia, Typha* sp., *Chara* sp., *Azolla* sp. and *Vallisneria spiralis.*

The present studies were undertaken during the surveys of wetlands from 1997 to 2000 and resulted in fish diversity comprised of 59 species spread over 37 genera, 16 families and 8 orders. The fish fauna of Kanjli and Ropar wetland has been documented here from the earlier records (Table 1).

Table 1. Fishes of Harike, Kanjli and Ropar of Punjab.

S.No.	Scientific Name	Common Name	Harike	Kanjli	Ropar
		Order Osteoglossiformes			
		Family Notopteridae			
1.	*Notopterus chitala* (Hamilton-Buchanan)	Humped featherback	+	+	+
2.	*Notopterus notopterus* (Pallas)	Grey feather back	+	+	+
		Order Clupeiformes			
		Family Clupeidae			
3.	*Gudusia chapra* (Hamilton-Buchanan)	Indian River Shad	+	+	+
		Order Cypriniformes			
		Family Cyprinidae			
4.	*Carassius auratus* (Linnaeus)	Gold fish, Gold Carp	+	-	-
5.	*Carassius carassius* (Linnaeus)	Crucian Carp	+	-	-
6.	*Catla catla* (Hamilton-Buchanan)	Catla	+	+	+
7.	*Cirrhinus mrigala* (Hamilton-Buchanan)	Mrigal	+	+	+
8.	*Cirrhinus reba* (Hamilton-Buchanan)	Reba Carp	+	+	+
9.	*Ctenopharyngodon idella* (Valenciennes)	Grass Carp	+	-	+
10.	*Hypothalmichthys molitrix* (Valenciennes)	Silver Carp	+	-	+
11.	*Cyprinus carpio* var. *communis* Linnaeus	Scale Carp	+	+	+
12.	*Cyprinus carpio* var. *specularis* Linnaeus	Mirror Carp	+	-	+

13.	*Labeo rohita* (Hamilton-Buchanan)	Rohu	+	+	+
14.	*Labeo angra* (Hamilton-Buchanan)	Angra Labeo	+	-	-
15.	*Labeo bata* (Hamilton-Buchanan)	Bata Labeo	+	+	-
16.	*Labeo calbasu* (Hamilton-Buchanan)	Black rohu, Kalbasu	+	+	+
17.	*Labeo gonius* (Hamilton-Buchanan)	Kuria Labeo	+	+	+
18.	*Labeo dero* (Hamilton-Buchanan)	Gid	+	-	+
19.	*Osteobrama cotio cotio* (Hamilton-Buchanan)	Cotio	+	+	-
20.	*Puntius sophore* (Hamilton-Buchanan)	Spot fin Swamp Barb	+	+	+
21.	*Puntius ticto* (Hamilton-Buchanan)	Two Spot Barb	+	+	+
22.	*Puntius chola* (Hamilton-Buchanan)	Chola Barb	+	+	-
23.	*Puntius terio* (Hamilton-Buchanan)	One Spot barb	+	-	-
24.	*Puntius sarna sarna* (Hamilton-Buchanan)	Olive Barb	+	+	-
25.	*Tor putitora* (Hamilton-Buchanan)	Putitor Mahseer	+	-	+
26.	*Amblypharyngodon mola* (Hamilton-Buchanan)	Pale Carplet	+		
27.	*Esomus danricus* (Hamilton-Buchanan)	Flying Barb	+	-	-
28.	*Parlucisoma daniconius* (Hamilton-Buchanan)	Blackline Rasbora	+	-	+
29.	*Salmostoma bacaila* (Hamilton-Buchanan)	Large razorbelly minnow	+	-	-
		Family Cobitidae			
30.	*Lepidocephalus guntea* (Hamilton-Buchanan)	Guntea Loach	+	-	-
31.	*Botia birdi* Chaudhuri	Birdi Loach	+	-	+
		Order Siluriformes			
		Family Bagridae			
32.	*Aorichthys aor* (Hamilton-Buchanan)	Long-whiskered catfish	+	-	-
33.	*Aorichthys seenghala* (Sykes)	Seenghari	+	+	+
34.	*Mystus bleekeri* (Day)	Day's mystus	+	-	+
35.	*Mystus cavasius* (Hamilton-Buchanan)	Gangetic mystus	+	-	+
36.	*Mystus vittatus* (Bloch)	Striped dwarf catfish	+	-	+
37.	*Rita rita* (Hamilton-Buchanan)	Rita	+	-	+
		Family Siluridae			
38.	*Ompok pabda* (Hamilton-Buchanan)	Pabda catfish	+	-	-
39.	*Ompok bimaculatus* (Hamilton-Buchanan)	Indian butter-catfish	+	-	+
40.	*Wallago attu* (Schneider)	Boal	+	+	+
41.	*Clupisoma gaura* (Hamilton-Buchanan)	Gaura Bachcha	+	+	+
42.	*Eutropichthys vacha* (Hamilton-Buchanan)	Batchwa vacha	+	-	-
43.	*Eutropichthys murius* (Hamilton-Buchanan)	Murius vacha	+	-	-
		Family Sisoridae			
44.	*Bagarius yarrellii* Sykes	Goonch	+	-	-
		Family Claridae			
45.	*Clarias batrachus* (Linnaeus)	Magur	+	-	+
		Family Heteropneustidae			
46.	*Heteropneustes fossilis* (Bloch)	Stinging catfish	+	-	+
		Order Cyprinodontiformes			
		Family Belonidae			
47.	*Xenentodon cancilia* (Hamilton-Buchanan)	Freshwater garfish	+	-	-
		Family Poeciliidae			
48.	*Gambusia affinis* (Baird & Girard)	Mosquito fish	+	-	-

		Order Synbranchiformes			
		Family Ambassidae			
49.	*Chanda nama* (Hamilton-Buchanan)	Elongate glass-perchlet	+	-	+
50.	*Pseudambassis ranga* (Hamilton-Buchanan)				
		Order Perciformes			
		Family Gobiidae			
51.	*Glossogobius giuris* (Hamilton-Buchanan)	Tank goby	+	+	-
		Family Belontiidae			
52.	*Colisa fasciatus* (Schneider)	Stripled Gourami	+	-	+
53.	*Colisa lalia* (Hamilton-Buchanan)	Dwarf Gourami	+	-	-
		Order Channiformes			
		Family Channidae			
54.	*Channa punctatus* (Bloch)	Spotted snakehead	+	+	+
55.	*Channa striatus* (Bloch)	Striped snakehead	+	+	+
56.	*Channa marulius* (Hamilton-Buchanan)	Giant snakehead	+	-	+
		Family Mastacembelidae			
57.	*Mastacembalus armatus* (Lacepede)	Tire-track spiny eel	+	+	+
58.	*Macrognathus aral* (Bloch & Schneider)	One striped spiny eel	+	-	-
59.	*Macrognathus pancalus* Hamilton-Buchanan	Striped spiny eel	+	+	-

Acknowledgement: The authors would like to thank the Director, Zoological Survey of India, for providing facilities.

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Trek to Siachen

Indian authorities have decided to open the doors of the world's coldest, highest and most unforgiving battlefield to pump up the adrenaline of adventure lovers.

The unprecedented move comes over 23 years after the Indian soldiers repelled the Pakistanis and hoisted the Tricolour on the strategically located Siachen glacier, which has been a no-entry sector for civilians.

Around 20 civilians were about to set out for the glacial adventure in the first week of October. The trek entails climbing heights of over 16,000 feet, as the trekkers trudge on frozen wastelands stretching from the Siachen base camp to Kumar post located at over 16, 000 feet.

The army is not taking any chances. The trekkers will first get acclimatised in Leh for 11 days before getting crash courses in icecraft, glacial training, crevasse travel, route finding and crevasse rescue at the Siachen battle school, located at over 12,250 feet. Only after roughing it out at the battle school, will the trekkers be allowed to head to Kumar - 12 kms and four days away with for staging camps on the way. Army's icecraft experts will escort them.

Siachen treks could become a regular feature depending on the response, an officer said.

MORPHOLOGICAL VARIATIONS IN SOME WEEDS OF WHEAT CROP AT PATNA, BIHAR

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Morphological variations between ecotypes, sub-species and even species have been found to be quantitative in nature and may depend on polygenic or multiple gene inheritance. In the present investigation, morphological variations in vegetative and reproductive life period of three plant species, viz., *Eclipta prostrata* Linn., *Croton bonplandianum* Baill, and *Euphorbia hirta* Linn., growing as weeds in the wheat crop fields, in and around Patna (Bihar) have been studied under uniform cultural conditions (Sinha & Sharfuddin, 2007).

A sample of 100 seeds per population of the three experimental plants were collected from their natural habitats. Each sample was sown in three earthen pots, of moderate size 9×12×12 inches, conaining well manured garden soil (Sinha et al., 2004). They were sprayed with 0.02% solution of insecticide rogger (Rallis India) for protection against insect attack. Following quantitative characters of experimental species were noted:

1. Root-length (cm), 2. Shoot-length (cm), 3. Number of branches per plant, 4. Number of leaves per plant, 5. Length of leaves (cm), 6. Breadth of leaves (cm), and 7. Number of fruits per plant.

It is established that local environmental factors contribute morphological variations in natural population of plants. Microhabitat features and biotic factors have been found to be responsible in many cases (Snayadon, 1973). Much of these variations are also genetically controlled (Hamrick, 1982).

In the present investigation, morphological variations in the three weed plant experimental species, growing in

Table 1. Morphological variations in three weed species.

Character	Eclipta prostrata				Croton bonplandianum				Euphorbia hirta			
	Range	Mean	S.D.	S.E.	Range	Mean	S.D.	S.E.	Range	Mean	S.D.	S.E.
Root-length (cm)	4-12	8	11.55**	±0.25	3.15-15	6.3	2.62**	±0.52	1.0-8	4.57	2.12	0.80
Shoot-length (cm)	40.7-65.4	52.65	8.86**	±1.25	18.5-85	38.34	14.47**	±2.89	1.5-33.0	17.0	5.0**	1.25
No. of branches per plant	4-10	7.0	2.21*	±0.31	31-44	43.88	2.61**	±0.52	0-7	3.6	4.01**	0.75
No. of leaves per plant	44-96	80.2	17.16**	±2.43	29-44	36.00	4.9**	±0.98	10-78	49.9	27.86**	±3.60
Length of Leaves (cm)	5.6-10.2	8.02	1.69	±0.24	2.3-4.5	3.31	0.77	±0.15	1.0-1.9	0.99	0.40	±0.05
Breadth of Leaves (cm)	1.7-3.2	2.65	0.49	±0.07	0.3-1.6	0.96	0.4	±0.08	0.1-0.5	0.33	0.22	±0.03
No. of fruits per plant	54-99	85.0	14.02**	±1.98	0-15	8.32	4.85**	±.097	23-65	43.13	10.33**	±1.34

** Significant at 1% level; *at 5% level.

different ecological niches, have been found to be due to the effect of edaphic and biotic factors. Variations in the three species were estimated in the seven morphological characters mentioned above. It was found that following five morphological characters have varied significantly:

1. Root length, 2. Shoot-length, 3. Number of branches per plant, 4. Number of leaves per plant, and 5. Number of fruits per plant (Table 1).

It is interesting to note that variability in these characters run together indicate some sort of linkage between them. The proportion of genetic variation in these characters is usually measured by quantity called 'heritability'.

The five macromorphic characters which show these morphological variations may be recognised as marker characters, as they may be due to the effect of any one or combination of the edaphic, biotic and climatic factors.

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Ganga and Indus in World's 10 Top Risk-Rivers

Two Indian rivers - Ganges and Indus - are among the world's 10 top rivers at risk threatening livelihoods of people along its banks in India, Bangladesh and Pakistan, a new global study by World Wildlife Fund (WWF) said in March 2007.

The rivers may not reach the oceans because of excessive extraction of water, fast receding rate of feeding glaciers and excessive pollution by human interference, the report released by WWF-India secretary-general Ravi Singh said. He added that implications of the report were serious and immediate steps should be taken to combat the "fresh water crisis" or else "risks will multiply".

Nearly 30 to 40 per cent water from the Ganges comes from giaciers, which were melting at a faster pace due to global warming. Gangotri, the feeding glacier is receding at nearly 21 metres per year, the report said.

Water withdrawl poses a serious threat to the Ganges with roughly 60 per cent of the flow being diverted to largescale irrigation, resulting in reduction in surface water resources, increasing dependence on ground water, loss of water based livelihoods. Pollution from industry and religious activities have taken their toll on the quality of water impacting agriculture, livestock and human health.

The loss is not only to humans. Endemic fish species of Ganges like hilsa, pangash, bacha, ghari, soal, koi, boal have become endangered because of habitat degradation, industrial and agricultural pollution and siltation.

Nearly 109 fishes and other aquatic and amphibian species in the rivers face prospect of habitat destruction. The endangered river dolphin faces an annual mortality rate of 10 per cent from pollution-related causes. Before the Ganga flows into the Sunderban delta, nearly 90 per cent of the water is extracted before causing sea level rise leading to incursion of saline water into the river reducing fresh water availability.

"The sea level rise has resulted in our island (Sagar) losing 70 square km of land since 1990 and increased salinity forcing us to change crop pattern and migration", Anil Kumar Khanar, a government school teacher in Sunderbans, said.

For Indus, climate change is the bigger threat than human interference as a huge portion (70-80 per cent) of the river is glacier-fed. Faster melting of Himalayan glaciers and huge extraction of water for agriculture would drastically reduce the volume of water and reduce the catchment area, the report said. More than India, the report blames the Pakistani government for the state of the river.

In 1990, the Pakistani provinces signed a water accord to ensure 10 million acre feet of water for the basin, but the promise remained on paper.

Moreover, the government provides huge water subsidies for agriculture development and proposes construction of six large dams on the river, further aggravating the threat. The WWF has called on the developed countries to help India and Pakistan reduce climate change impact on the rivers.

NEW RECORDS OF FRUIT FLIES FROM UTTAR PRADESH

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Altogether 29 species of fruit flies were reported from the undivided state of Uttar Pradesh (before 2002). Recently, Mitra & Bhattacharya (2006) reported 17 species (5 species as new records) from the state of Uttarakhand. So, there were only 17 species known from the state of Uttar Pradesh (after separation). The present paper is based on recent surveys in Uttar Pradesh by the scientists of the Zoological Survey of India (2005-2006) and accounts occurrence of three new records of fruit flies belonging to genus *Dacus*.

1. Dacus (Hemigymnodacus) diversus Coquillett

1904. *Dacus diversus* Coquillett, *Proc. ent. Soc. Wash.*, 6:139.

Type-locality: Colombo and Bangalore.

Material examined: 2♀♀, Bahadurpur, Sultanpur dist., 17.ix.2006, coll. M. Sil.

Distribution: India: Uttar Pradesh, Karnataka.

Elsewhere: Sri Lanka, Thailand.

2. Dacus (Zeugodacus) cucurbitae Coquillett

1899. *Dacus cucurbitae* Coquillett, *Ent. News*, 10: 129.

Type-locality: Honolulu, Hawaii.

Material examined: 1♂, Mailani, Lakhimpur Kheri dist., 5.iv. 2007, coll. B. Mitra; 1♂, Sarsawa, Saharanpur dist., 15.xi. 2005, coll. S.I. Kazmi; 1♂, Phalera, Meerut dist., 22. xi. 2005. coll. S.I. Kazmi.

Distribution: India: Uttar Pradesh.

Elsewhere: Widespread Oriental, including China, Ryukyu Island, Japan, Pacific, New Guinea, Solomon Island, Bismark Archipelago, Darwin, Australia, Mauritius, Africa.

3. Dacus (Zeugodacus) tau (Walker)

1849. *Dasyneura tau* Walker, *List Dipt. Colln Br. Mus.*, 4: 1074.

Type-locality: Foochow, China.

Material examined: 1♀, Sarsawa, Saharanpur dist., 15.xi. 2005, coll. S.I. Kazmi; 1♀, Pundal, Agra dist., 8. iii. 2006, coll. B. Biswas.

Distribution: India: Uttar Pradesh, Uttarakhand.

Elsewhere: Widespread Oriental.

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Zoos to Breed Critical Species

Calling it as "good insurance for future eventuality," the Central Zoo Authority (CZA) has embarked on a programme, which envisages Indian zoos to have at least 100 physically and behaviourally healthy individual animals/birds of critically endangered species.

Indian zoos have a double role: to sustain their own population of endangered wild life species and to help in augmenting the depleting numbers in the wild. For instance, the Delhi Zoo presently runs a successive conservation-breeding programme for five special from the list of endangered species.

"These five species are Brow Antlered Deer (Manipur Deer), Lion, Tiger, Red Jungle Fowl and the Rhino, "Zoo Director D.N. Singh said.

Said CZA Member Secretary B.R. Sharma, "Against the target of 250 in zoos across the world, we wish that there should be at least 100 each in Indian zoos. We have identified 62 species – whose numbers are less than 2500 – as endangered."

Explaining "good insurance for future eventuality", Sharma says, "One of these species suffers a huge loss due to an epidemic or some infection. Then we know, there are at least 100 individuals of this category safely breeding in Indian zoos."

Like the Delhi Zoo, other Indian zoos too have been running conservation-breeding programmes for a number of species already.

EFFECT OF DIELDRIN ON THE GROWTH OF HETEROCYSTOUS CYANOBACTERIA, *AULOSIRA FERTILISSIMA*

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Water and soil are two important matrices which support enormous forms of lives. Micro-organisms comprise the major components in these two ecosystems. Microbes form the primary link in biological degradation of soil humus and other complex organic material. They fix nitrogen, carbon, maintain proper pH and degrade certain chemical pollutants from toxic to non toxic forms. Among the micro-organisms, cyanobacteria are O_2 evolving photosynthetic prokaryotes, most of them ATP - dependent nitrogenase activity and are able to fix atmospheric nitrogen (Carr & Whitton, 1982). Heterocystous cyanobacteria, *Anabaena, Aulosira* etc. are good examples of biocatalyst systems for the production of fuel hydrogen and fertilizer. These organisms inhabit rice fields and moist soil where insecticides are used excessively for the control of insects. Reports have indicated that the beneficial activities of these organisms might be harmfully affected. The microflora of waters is affected by refuse and sewage in many ways (Bjerk & Brevik, 1980; Duy et al., 2000), with domestic sewage particularly many micro-organisms get into rivers, lakes and coastal waters. Added to these are quantities of organic and inorganic nutrients which cause mass development of cyanobacteria. On the other hand the microflora is not infrequently inhibited or even largely destroyed by poisonous substances (Maule & Wright, 1983; Lal & Saxena, 1987).

In the present study, insecticide (dieldrin) and heterocystous cyanobacteria *(Aulosira fertilissima)* were used for the experiment. Culture were treated with appropriate concentrations (1, 10, 50 and 100 ppm) insecticide separately and maintained under optimum growth conditions. Cultures in triplicate were sampled each day till 5 days. At each sampling time, *Aulosira* mass was separated by centrifugation at 500 rpm for 10 minutes and packed cells were washed thrice with distilled water. Since bioconcentration of insecticide is expressed in terms of dry weight, corresponding triplicate cultures were also processed for dry weight measurement (Wallace, 1994).

The growth response of *Aulosira fertilissima* to dieldrin is shown as percent of acetone control (Adams et al., 1986). Results indicate that 1 ppm dieldrin was least toxic to the growth of *Aulosira*. Maximum inhibition of 15.5 percent ($P<0.05$) was observed on 10th day. Subsequently, the heterocystous cyanobacteria recovered and the percent inhibition was 27.5 after 15 days, and thereafter stimulation of 11.26 percent ($P<0.05$) noticed after 20 days with increase in dieldrin concentration to 10 ppm, the percent inhibition of growth also increased. It was maximum 29.52 percent ($P<0.01$) by 10 days. During the rest of the period only marginal stimulatory (3.41 percent by 20 days) and inhibitory (6.92 percent by 25th day) effects were observed. Dieldrin at 50 ppm inhibited the growth by 39.11 percent ($P<0.001$) on 10th day. However, this inhibitory effect was transient and the cultures recovered considerably with passage of time. At 100 ppm dieldrin was extremely toxic to *Aulosira* and within 5 days growth was reduced by 53.11 percent ($P<0.01$). This toxic effect continued till 25 days and afterwards the cultures became somewhat healthier as an inhibition of 13.89 percent was observed at the end of the experimental period. Filaments of *Aulosira* showed no morphological deformities with dieldrin.

In the present study, dieldrin was found very toxic to *Aulosira fertilissima*. Dieldrin at 1, 10, 50 and 100 ppm suppressed the growth of *Aulosira* cultures by 15.50, 29.52, 39.11 and 53.11 percent respectively after 5 days of treatment. No alternation in subcellular structure were observed, although, fewer cells with normal internal structure were found in the samples which had been exposed to higher concentration of the insecticide.

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EXTERNAL MALE GENITALIC STRUCTURES OF A MOTH, *ERESSA APERIENS* (LEPIDOPTERA : ARCTIIDAE)

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The genus *Eressa* was proposed in 1854 by Walker, on the type species *confinis* Walker, from North India. Hampson (1892) described *Eressa* Walker in a sub-section under *Syntomis* Ochsenheimer, and included 12 species under it from the then British India. In 1912, Zerny studied 10 species under *Eressa,* which included the species *E. aperiens* (Walker). Obraztsov (1954) also used *Eressa* as a generic name, which was later on reviewed by Arora (1980). Holloway (1988) studied the male and female external genitalic characters of *E. confinis* Walker, along with two other species from Borneo.

Collection surveys in different localities of Western Ghats of India from 2003-2005, led to the collection of two individuals of *E. aperiens* from Mahabaleshwar in Maharashtra (Fig. 1). Specimens were identified from literature (Hampson, 1892; Zerny, 1912). External male genitalic structures of this species have been illustrated and studied in this communication. Collection of *E. aperiens* (Walker) from Mahabaleshwar is a new distributional record.

Genus *Eressa* Walker

Walker, 1854, *List Spec. Lepid. Inst. Colln. Br. Mus.,* 1: 149.

Type species: Glaucopis confinis Walker.

Distribution: Indo-Australian region.

Diagnosis: Labial palpi porrect. Antennae bipectinate in males, serrate in females. Forewing with vein R1, R2, R3, R4 and R5 stalked, originating slightly before upper angle of cell; M2 and M3 from lower angle. Hindwing with vein M1 and M2 absent; Cu1 from lower angle of cell; Cu2 present. Hind tibia with single pair of spurs. Male genitalia with uncus broad at base, tapering towards tip; valvae simple; aedeagus long and narrow; vesica membranous without any cornutus. Female genitalia with corpus bursae bearing a single, rhomboidal signum.

Eressa aperiens (Walker)

Syntomis aperiens Walker, 1864, *Cat. Lep. Het.,* 31: 68.

Syntomis aperiens Walker, 1864; Hampson 1892, *Fauna Br. Ind. Moths,* 1: 221.

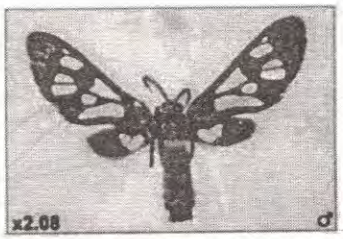

Fig. 1. - Adult of *Eressa aperiens.*

Eressa aperiens (Walker, 1864) Zerny, 1912, *Lepidopterum Catalogus,* 7: 32.

Male genitalia: Uncus strongly built, broad at base, gradually tapering towards tip, setosed with fine setae, well sclerotized, tip pointed; acrotergite absent, fenestrula small, ractangular; tegumen as long as uncus, broad u-shaped; vinculum longer than tegumen, deep u-shaped, well sclerotized; saccus developed. Valvae simple, not differentiated into sub parts. Transtilla membranous; juxta cone shaped; aedeagus long and narrow with proximal end broad; vesica membranous, cornutus absent, ductus ejaculatorius entering apically (Fig. 2).

Wing expanse (half): Male 12 mm.

Material examined: Maharashtra : Mahabaleshwar (1320 mt.), 8.x.05, 2♂♂.

Distribution : India: Nilgiri Hills (Tamil Nadu) and Maharashtra.

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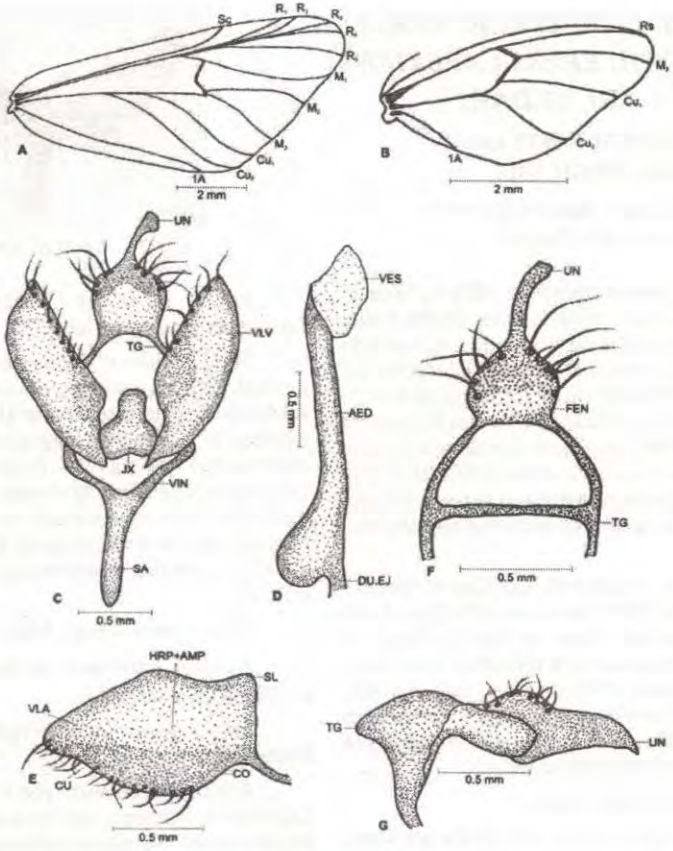

Fig. 2. - External Male Genitalic Structures of *Eressa aperiens.*

AED : Aedeagus, AMP+HRP : Ampulla & Harpe (fused), CO : Costa, CU : Cucullus, Du. Ej. : Ductus Ejaculatorius, FEN : Fenestrula, JX : Juxta, SA : Saccus, SL : Sacculus, TG : Tegumen, UN : Uncus, VES : Vesica, VIN : Vinculum, VLA : Valvula, VLV : Valva.

How to Meditate ?

Each Religion has places of worship where people gather. But true prayer and meditation takes place in silence, in the holy precincts of the human body. Saints and mystics have spent time in meditation and have found God. Each one of us can also find God. All we need is a desire to meet him and to learn how to pray and meditate.

Meditation is taking away our attention from the outside world and focussing on the inner. First, we close our eyes to shut out the outer world. We need to sit in a comfortable pose – to remain focused within. We have a doorway into the spiritual world beyond – known as the single eye or third eye – which is located between and behind the two eyebrows.

When we close our eyes, we focus our attention into the middle of the darkness in front of us. By gazing there, we'll find inner light. By concentrating on this, our soul will withdraw from the body and begin entering divine worlds within. We also have within us inner sound, which is the holy word of God. By listening to this as well, our soul can enter the inner divine worlds.

We will find that nonviolence, truthfulness, purity, selfless service will become a part of our lives when we learn to meditate.

ROLE OF ADRENALINE IN REGULATION OF BLOOD GLUCOSE LEVEL OF AN INDIAN TELEOST FISH, *CLARIAS BATRACHUS*

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Adrenaline is a known hyperglycemic agent in mammals and birds, but in fishes its role has not been well ascertained. The scantily available records indicate that adrenaline either causes immediate hyperglycemia (DeRoos & De Roos, 1978) or a delayed hyperglycemia (Larsson, 1973; Khanna & Bhatt, 1975). Lipslow et al. (1972) found in nurse shark *Ginglymostoma cirratum,* catecholamine to have a lipolytic role instead of glycogenolytic role.

In view of the divergent results reported by earlier workers, the authors of present work have made a comprehensive study of the role of adrenaline in regulation of blood glucose in an Indian teleost fish, *Clarias batrachus* (Linnaeus), by injecting exogenous hormone of different doses and recording the blood glucose level at different intervals of time.

Healthy adult specimens of both sexes, weighing between 100-120 gm, were obtained from the ponds around Patna, during the non-breeding season (October to February) of the fish. The fish were kept in 50 litre glass aquaria in small batches for seven days, to allow them to recover from asphyxia. The fish were injected intramuscularly with different doses (0.1, 0.2, 0.4, 0.8, and 1.0 mg/100 gm body weight) of adrenaline. Saline injected experimental controls were maintained alongwith each dose. Before autopsy the fish were killed by cutting their spinal cord. Blood was collected directly from the heart. Blood glucose was quantitatively estimated as per the method of Foline & Wu (1920).

The fish were fed daily on small pieces of goat liver, earthworm and minced fish flesh *ad libitum.* Sampling for blood glucose was made after 20 min, 40 min, 1 hr., 2 hr, 4 hr., 8 hr., 12 hr., 24 hr., 48 hr., 72 hr., and 96 hr., of the hormone therapy. Each sample included ten fish.

The results show that adrenaline produces an immediate hyperglycemia within 20 minutes of hormone administration. Hormone appeared to be most effective by an hour of treatment, while at all dose levels hyperglycemia was noticed. Progressive dose dependent hypoglycemia appeared till 72 hours, after which the recovery trend began.

Under present study, a hyperglycemic effect was observed first at 20 minutes after treatment at all dose levels. The peak in blood glucose level is reached about an hour after the hormone injection. After 2 hours there is a fall in blood glucose level, a fall which is largely dose dependent. It is important to note that the magnitude of hyperglycemia and the rate at which glucose level falls back to normal level is dose dependent, with the higher dose eliciting higher hypoglycemia and the lower dose producing low grade increase in blood glucose level. This finding is in agreement with those of De Roos & De Roos (1978) on shark. Khanna & Bhatt (1975) and Bhatt et al. (1979) have not reported any variation in hyperglycemia dependent on dose in this species of fish.

The fall in blood glucose level after 2 hours of hormone administration may be due to either of the two factors-

a) an increase uptake of glucose from the peripheral circulation; or

b) an increase in insulin level which actually decreases blood glucose.

There is no available evidence to show that adrenaline increase the rate of glucose uptake. There is, however, evidence that epinephrine acts in someway in the mammals to depress the utilization of carbohydrate by tissue (Turner & Bagnara, 1976). Singh et al. (1973) have found that adrenaline when given separately increases both the plasma insulin levels as evidenced by the net insulin production and its assimilation. A fall in blood glucose level in the later stages of the experiment is probably due to increased insulin production by the fish as a result of higher adrenaline levels in the injected fish. A low level of blood glucose between 4 hours to 72 hours would probably have an stimulatory effect on the adrenal medulla of fish and consequent increase of endogenous adrenaline probably account for the recovery in the blood glucose level at later stage. The recovery might also be due to the stimulatory effect of adrenaline on the hypothalamus which causes increased ACTH secretion and consequent secretion of adrenal glucocorticoids which in turn stimulates gluconeogenesis and thereby increases the blood glucose level.

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SALT TURNS BLACK IN KUTCH

Mounds of salt are piled up in flat square pans across the rugged unending expanse in Kutch, India's salt hub. But something stands out in the image: the salt is black.

A massive reconstruction programme in the arid Kutch district after the 2001 earthquake saw dozens of major industries being set up, taking advantage of tax breaks from the central and state governments.

But salt in the region is turning black and salt manufacturers and the local industry body say it is due to rampant pollution from the new industries.

Officials say they are investigating the matter, and will try to ensure that the salt from the region, mostly used for industrial purposes, does not reach people's homes. Even so, salt manufacturers say, the polluted salt has forced serious financial losses and many small manufacturing units employing thousands of peeople may have to shut down.

Gujarat is India's biggest producer of salt. It made 1.37 crore tonnes last year of the 1.8 crore tonnes produced in the 11 salt-making states.

After the post-earthquake tax breaks, "we believe investment of up to Rs. 20,000 crore came in. That also brought in polluting industries–steel plants coke-based industries, edible oil refineries etc. , said Parasmal Nahta, President of the Gandhidham Chamber of Commerce and Industry.

"There are more than 30 steel plants in Kutch district. Steel plants were supposed to have ESP units–to control smoke emission. Many did not put up these units–or put them up and did not use them," Nahta said. "So the salt turns black. And that carbon gets deposited inside the crystals during crystallization. It looks white on top but it has carbon inside."

The companies deny the allegations.

"There is no such thing. There were some such plants in Kutch which were polluting earlier, but now there is none. And we have never polluted the environment, we have installed pollution control equipment," said Kunal Babna of steelmaker Versana Ispat.

"The salt pans are not affected by us in any way," said Hitesh Thakur of Gokul Refoils, which makes edible oils. In Jaipur, the office of the Salt Commissioner said it was looking into the complaints. "It was brought to our notice this month (December 2007). I have asked for a report from our office in Ahmedabad," M.A. Ansari, India's Deputy Salt Commissioner, said.

Of about 50 lakh tonnes produced in Gandhidham, about 30 lakh tonnes are exported or sold in India for industrial-use. But there are concerns over industrial-use salt being illegally sold for domestic consumption.

"This is an area of concern–that the salt does not reach the homes of citizens," Ansari said.

"But we ae looking into it."

In Gandhidham, nearly 1 lakh people survive on the salt business. Salt makers say their livelihood could be at stake if they have to keep selling polluted salt.

The situation is grim for the kutch region and the state of Gujarat in particular, and to the salt manufacture in the country in general. Urgent steps are necessary to control the pollution of salt.

SOME PRAYING MANTIDS OF NASIK DISTRICT, MAHARASHTRA

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Nasik district lies between 19° 35' and 20° 52' N latitude and 73° 16' and 74° 56' E longitude, with area of 15, 582 sq. km. It is bound on the north-west by the Dangs and Surat districts of Gujarat, on the north by Dhulia district, on the east by Jalgaon and Aurangabad districts, on the south by Ahmadnagar district and towards the south-west by Thana district of Maharashtra. The Godavari is the important river of this district which originates from a peak of the western ghat at Trimbak, in Nasik district. The annual average rainfall in the district is 1034 mm. The forests cover an area of 33446.28 sq. km.

Mantids are a peculiar group of insects showing specific body structure and vivid types of behaviour. They are predaceous, commonly distributed at the warm and moist regions of the world and rarely at the temperate zone. They are usually seen among vegetation, on flowers, grass leaves, twigs and only sometimes within home premises. Not much record is available on the mantids of Nasik district.

The present study records 10 species of mantids belonging to 8 genera and 3 families. Two species, i.e. *Empusa pauperata* (Fabricius) and *Elmantis trincomaliae* (Saussure) were reported earlier from the Nasik district by Nadkerny (1965). Thus, a total of 12 species are now known so far from this district.

During 2005-2007 mantids were collected by author in Nasik district. Available other collection from old surveys in Nasik district, present in W.R.S. were also studied. The specimens were identified according to the Indian monograph by Mukherjee et al. (1995).

All measurements are in mm., which are given for Body length (BL), pronotum (PN) and forewing (FW). Distribution is shown for Indian states. Earlier mantid studies from Maharashtra were by Nadkerny (1965, 1974), Chaturvedi & Hedge (2000), and Ghate & Ranade (2002), and recently from Kerala by Vyjayanti (2007).

The systematic list of the mantids from Nasik district is as follows:

Family: Amorphoscelidae

Subfamily: Amorphoscelinae

1. *Amorphoscelis annulicornis* Stal

Coll. Site: 1♂, near Daman river Harshul, Tal. Peith, Coll. D.B. Bastawade, 4-2-1984, Reg. No. E/344.

Measurements: BL: 15.0, PN: 3.1.0, FW: 13.

Distribution: India: Assam, Bihar Himachal Pradesh, Kerala, Meghalaya, Tamil Nadu, West Bengal, Maharashtra.

Family: Hymenopodidae

Subfamily: Acromantinae

2. *Hestiasula brunneriana* Saussure

Coll. Site: 1♂, Anjaneri on the way to Trimbakeshwar, Coll. S.S. Jadhav, 12-2-2006, Reg. No. E/5316.

Measurements: BL: 21, PN: 4.1, FW: 18.

Distribution: India: Andhra Pradesh, Meghalaya, West Bengal, Maharashtra, Kerala.

Subfamily: Hymenopodinae

3. *Creobroter apicalis* Saussure

Coll. Site: 1♂, rest house at Sawarna tal. Peith, Coll. D.B. Bastawade, 16-2-1984, Reg. No. E/342.

Measurements: BL: 27.0, PN: 8.1, FW: 23.9

Distribution: India: Assam, Karnataka, Manipur, Meghalaya, Orissa, Sikkim, West Bengal, Maharashtra.

Family: Mantidae

Subfamily: Liturgusinae

4. *Humbertiella affinis* Giglio-Tos

Coll. Site: 1♀, Sawargaon, Tal. Dindori, Coll. S.S. Jadhav, 15-2-2005, Reg. No. E/5317.

Measurements: BL: 28.0, PN: 6.7, FW: 20.

Distribution : India: Orissa, Karnataka, Maharashtra.

5. *Humbertiella ceylonica* Saussure

Coll. Site: 1♂, Vaigole village 7-10 kms. of Harsul tal. Peith, Coll. D.B. Bastawade, 5-2-1984, Reg. No. E/345.

Measurements: BL: 32.0, PN: 6.2, FW: 27.

Distribution: India: Assam, Bihar, Karnataka, Madhya Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal, Goa.

Subfamily: Mantinae

6. *Hierodula (Hierodula) doveri* Chopard

Coll. Site: 1♀, Kotambi 16 km SW of Harsul, tal. Peith, Coll. D.B. Bastawade, 8-2-1984, Reg. No. E/343.

Measurements : BL: 63.5, PN: 22.6.0, FW: 46.3

Distribution: India: Karnataka, Orissa, Tamil Nadu, Maharashtra, Kerala.

7. *Hierodula (Hierodula) unimaculata* (Olivier)

Coll. Site: 1♂, Shindegaon tal. Nasik, Coll. S.S. Jadhav, 26-12-2006, Reg. No. E/5314.

Measurements: BL: 58.0, PN: 20.4, FW: 46.0

Distribution: India: Karnataka, West Bengal, Maharashtra, Goa.

8. *Hierodula (Rhombodera) tectiformis* Saussure

Coll. Site: 1♂, Moh village, tal. Sinnar, Coll. S.S. Jadhav, 12-12-2005, Reg. No. E/5315.

Measurements : BL: 67.0, PN: 18.5, FW: 54.0

Distribution: India: Bihar, Sikkim, Tamil Nadu, West Bengal, Maharashtra, Goa.

9. *Parhierodula (Parhierodula) coarctata* Saussure

Coll. Site: 1♂, rest house at Sawarna tal. Peith, D.B. Bastawade, 16-2-1984, Reg. No. E/342.

Measurements: BL: 50.0, PN: 150, FW: 45.0

Distribution: India.

10. *Statilia maculata* (Thunberg)

Coll. Site: 1♀, Shindegaon tal. Nasik, Coll. S.S. Jadhav, 22-9-2006, Reg. No. E/5318.

Measurements : BL: 44.0, PN: 15.0, FW: 32.8

Distribution: India: Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Himachal Pradesh, Madhya Pradesh, Meghalaya, Sikkim, Uttar Pradesh, West Bengal, Maharashtra, Kerala.

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Conference

Seminar on 'Combating Pollution to create a Healthier Planet'

Held at Kanpur (U.P.), on the 10th-12th Dec. 2007.

Vice Chancellor of Aligarh Muslim University Dr. Abdul Azis has said the government should set up a national climate authority to check growing environmental pollution in the country. Inaugurating the seminar at the Merchants Chamber on Monday, Azis said people should take note of the growing pollution as it endangered life on the planet.

Department of Zoology at DG Girls College organised the seminar in association with Indian Science Congress, Kanpur Chapter. Prof Azis said, besides creating a new authority for pollution control, it should also streamline the existing pollution control panels in the country and should introduce long and short-term programmes for pollution control.

Addressing the seminar, Vice-chancellor of Chandra Shekhar Azad University of Agriculture and Technology Dr. V.K. Suri said that 'Mental Pollution' was the biggest threat to the environment and to the people on this planet. He said the social environment and greedy people were responsible for mental pollution. By controlling mental pollution all other pollutions could be checked, he added.

Vice-chancellor of Chhtrapati Sahu Ji Maharaj University Dr. L.C. Misra stressed an Eco-Legislation should be introduced at the global level and its strict implementation should be ensured. Former V-C of Urdu University Hyderabad Prof. Shamim Jairajpuri said man should stop disturbing "counter balancing factors".

Ex-vice chancellor of CSJMU Dr. S.S. Katiyar suggested for using 'Clean Technologies' in the production and other industrial processes. Since the developed nations were using clean technology, they could transfer it at low cost to the developing and under-developed countries in the wider interests of the human welfare, he added.

A CHECKLIST OF LYCAENID BUTTERFLIES FROM HIMACHAL PRADESH

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The state of Himachal Pradesh in northwestern India is harbouring some of the world's richest biodiversity. It is situated from 30° 22' to 33° 12' N latitude and 75° 45' to 79° 04' E longitude in the Himalayan mountain system. However, the habitat change and deforestation activities have greatly affected its floral and faunal elements. The butterflies are no exception to it. Thus, inventories on them are urgent need of the day.

The butterflies of family Lycaenidae, commonly called as blues, represent second largest group of butterflies in terms of number of species. Arora et al. (2005) recorded 82 species of the lycaenids from this region, based on previous literature, and actually observed only 8 species. In the present report, 60 species of Lycaenid butterflies are reported, which were collected during different surveys (from 1993 to 2007) from Himachal Pradesh. The region includes certain high altitude areas like Pangi Valley, and Lahaul and Spiti. The scientific nomenclature of various species has been largely followed from Varshney (1997).

Status of abundance is shown as – VC: Very common; C: Common; NC: Not common; R: Rare; VR: Very rare. The list shows every species by its scientific name, common name and its status in H.P., in that order.

I. Subfamily: Theclinae Swainson
Common name: Hairstreaks

1. *Satyrium sassanides* (Kollar). Whiteline Hairstreak, VC
2. *Horaga onyx onyx* (Moore). Common Onyx, VR
3. *Horaga albimacula viola* Moore. Brown Onyx, VR
4. *Chaetoprocta odata* (Hewitson). Walnut Blue, NC
5. *Euaspa milionia* (Hewitson). Water Hairstreak, NC
6. *Euaspa ziha* (Hewitson). White Spotted Hairstreak, NC
7. *Chrysozephyrus ataxus ataxus* (Westwood). Wonderful Streak, VR
8. *Chrysozephyrus birupa* (Moore). Fawn Hairstreak, VR
9. *Spindasis nipalicus* (Moore). Silver-grey Silverline, NC
10. *Spindasis vulcanus vulcanus* (Fabricius). Common Silverline, C
11. *Spindasis ictis ictis* (Hewitson). Common Shot Silverline, R
12. *Spindasis elima* (Moore). Scarce Shot Silverline, R
13. *Pratapa icetas icetas* (Hewitson). Dark Blue Royal, VR
14. *Arhopala ganesa ganesa* (Moore). Tailless Bushblue, NC
15. *Arhopala dodonaea* (Moore). Pale Himalayan Oakblue, NC
16. *Arhopala rama rama* (Kollar). Dark Himalayan Oakblue, NC
17. *Arhopala atrax* (Hewitson). Indian Oakblue, NC
18. *Arhopala amantes amantes* (Hewitson). Large Oakblue, NC
19. *Deudorix epijarbas anacus* Fruhstorfer. Cornelian, NC
20. *Rapala iarbus* (Fabricius). Common Red Flash, C
21. *Rapala nissa* (Kollar). Common Flash, NC
22. *Rapala selira* (Moore). Himalayan Red Flash, R

II. Subfamily: Lycaeninae
Common name: Coppers

23. *Heliophorus sena* (Kollar). Sorrel Sapphire, VC
24. *Heliophorus oda* (Hewitson). Eastern Blue Sapphire, C
25. *Heliophorus androcles* (Westwood). Green Sapphire, C
26. *Lycaena phlaeas* (Linnaeus). Common Copper, VC
27. *Lycaena panava* (Westwood). White-bordered Copper, C
28. *Lycaena kasyapa* (Moore). Green Copper, C

III. Subfamily: Polyommatinae
Common name: Blues

29. *Tarucus venosus* Moore. Himalayan Pierrot, NC
30. *Tarucus hazara* Evans. Evans' Pierrot, C
31. *Tarucus balkanicus* (Freyer). Black-spotted Pierrot, C
32. *Castalius rosimon* (Fabricius). Common Pierrot, VC
33. *Leptotes plinius* (Fabricius). Zebra-blue, C
34. *Lampides boeticus* (Linnaeus). Pea Blue, VC
35. *Prosotas nora ardates* (Moore). Common Line Blue, VC
36. *Oreolyce (Arletta) vardhana vardhana* (Moore). Dusky Hedge Blue, NC
37. *Acytolepsis puspa gisca* (Fruhstorfer). Common Hedge Blue, NC
38. *Celatoxia marginata marginata* (de Niceville). Margined Hedge Blue, C
39. *Celastrina argiolus kollari* (Westwood). Hill Hedge Blue, C
40. *Celastrina huegelli huegelli* (Moore). Large Hedge Blue, VC
41. *Celastrina gigas* (Hemming). Silvery Hedge Blue, C
42. *Catochrysops strabo asoka* (Kollar). Forget-me-not, C
43. *Euchrysops cnejus cnejus* (Fabricius). Gram Blue, C
44. *Everes lacturnus* (Godart). Indian Cupid, C
45. *Everes argiades diporides* Chapman. Chapman's Cupid, C
46. *Everes huegelli huegelli* (Gistel). Tailed Cupid, VC
47. *Freyeria putli* (Kollar). Tiny Grass Jewel, C
48. *Freyeria trochylus* (Freyer). Grass Jewel, R
49. *Albulina galathea* (Blanchard). Large Green Underwing, C
50. *Polyommatus icarus* (Rottemburg). Violet Meadow

Blue, NC
51. *Polyommatus eros* (Ochsenheimer). Common Meadow Blue, C
52. *Chilades parrhasius parrhasius* (Fabricius). Small Cupid, C
53. *Chilades lajus lajus* (Cramer). Lime Blue, VC
54. *Chilades pandava pandava* (Horsfield). Palins Cupid, C
55. *Chilades vicrama cashmirensis* (Moore). Chequered Blue, C
56. *Aricia agestis* (Denis & Schiffermueller). Brown Argus, VC
57. *Zizula hylax* (Fabricius). Tiny Grass Blue, NC
58. *Zizina otis* (Fabricius). Lesser Grass Blue, C
59. *Peudozizeeria maha* (Kollar). Pale Grass Blue, VC
60. *Zizeeria karsandra* (Moore). Dark Grass Blue, VC.

Acknowledgement: The authors are grateful to Dr. Ramakrishna, Director Incharge, Z.S.I., for providing facilities.

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Sheep Trained to Weed Vineyards

Call them mutton mowers. University researchers are training sheep to clean up vineyard weeds but stay off the grapes.

They are used in vineyards as a green alternative to tractors and remove weeds–a necessary task to deter pests and keep vines healthy–sans herbicides. Unfortunately, sheep will chew up thousands of dollars worth of grapes if left to their own devices.

That is why University of California, Davis, researcher Morgan Doran and his colleagues are experimenting with Aversion Therapy and other techniques to turn sheep into better field hands. Sheep ranchers get a new market for their flocks while vineyard managers get "another tool in the tool box," Doran said.

Teaching is not tough as you might think, said Doran, who thinks sheep are unfairly maligned as wooly minded creatures. "They're very good at what they do," he said. What they do is eat–all day, every day. "Everything that we are doing is based on their skills at eating different foods and detecting different flavours and associating positive or negative effects of those foods with different flavors," he said.

Doran's project is based on the recommendations of Aversion Therapy techniques developed by an animal behaviourist at the Utah State University.

Sheep that had never tasted grape leaves were brought in and allowed to stuff themselves on vines. The animals then got a small dose of lithium chloride, a drug that does not produce any outward signs in the dosed sheep but leaves them feeling queasy. Some sheep got the dose in liquid form, some in capsules and two other groups of sheep got placebos to serve as a control. Sheep that were dosed generally left the grapes alone when set loose in an experimental vineyard at the UC Hopland Research and Extension Center south of Ukiah.

A recent visit to the vineyard showed tangible results: bunches of fruit hung on the vines weeded by trained sheep.

Biology Related to Cold

If the chill is getting to you, don't blame the weather – blame biochemistry. Research published in the *Journal of Neuroscience* explains how 'cold fibres' that connect neurons near the spinal cord to nerve endings in the skin help us sense the cold. A protein called TRPM8 alerts these fibres when to relay cold signals up the spine to the brain.

What makes us feel cold is, of course, the absence of energy, or heat, which is essentially the vibration of molecules. As molecules lose energy, they vibrate less–and their temperature drops. Remember, the sun does not shine much in northern latitudes at this time of the year. The air there radiates heat into space, and becomes very cold. Shifting winds bring this cold air to lower latitudes like Delhi.

When this cold air drains heat from our skin molecules, we go 'brrr'. The faster energy is drained away, the colder it gets. This is called the wind chill factor–a term coined by US scientist paul Siple in 1941. Wind increases heat loss, making it seem colder than what the thermometer shows. If the temperature is, say, +1, a howling wind makes you feel as if it were – 15, although water still doesn't freeze !

Low temperatures impair body functions as nerve cells and finger muscles work slowly: 12°C is critical for manual dexterity and 8°C for touch sensitivity.

Low temperatures also weaken pain receptors, allowing ice packs on sprains to reduce the swelling and pain. When the skin temperature falls below 10°C, blood vessels dilate and constrict alternately as the body tries not to lose heat from the extremities, while keeping the blood supply to the skin going. So our cheeks and noses turn red in frosty weather. And the lowest temperature you can endure? In still air, wearing light clothing, you start to feel the cold below 10°C, before physiological respones like shivering (to increase body heat) kick in. Not that we would want to check it out in this weather.

–Prakash Chandra

ON A COLLECTION OF COLLEMBOLA INSECTS FROM THE OKHLA RESERVE FOREST, NEAR GHAZIABAD (U.P.)

G. P. MANDAL

Apterygota Section,
Zoological Survey of India,
M Block, New Alipore,
Kolkata - 700 053.

Collembola, commonly called spring tails, are small insects, the largest species attaining a maximum length of 6 mm. The mouth parts are withdrawn into the head capsule; the first abdominal segment bears a ventral pair of basally fused vesicles, the collophore; most species have ventral bifurcate appendage, the tenaculum and furcula, on the third and fourth abdominal segments. With very few exceptions (e.g., *Tomocerus*), juveniles resemble closely adults. Collembola are abundant and ubiquitous, probably exceeding all other insects in numbers of individuals, but their small size and sensitivity to desiccation restrict most species to humid situations.

The present study of collembolan insects is based on a collection from the Okhla Reserve Forest, near Ghaziabad (Uttar Pradesh). Survey was done during November, 2006. Altogether 11 species were collected, representing 10 genera and 4 families. Identification of specimens were done using a phase contrast compound microscope, following Christiansen & Bellinger (1980). This is the first report of collembolan fauna from the Okhla Reserve Forest, Ghaziabad. The list of species encountered is given as follows:

Order: Collembola

Suborder: Arthropleona

Family: Hypogastruridae

1. *Hypogastrura indovaria* Salmon, 1970
2. *Xenylla obscura* Imms, 1912

Family: Onychiuridae

3. *Onychiurus indicus* Choudhuri & Roy, 1965

Family: Entomobryidae

Subfamily: Entomobryinae

4. *Lepidocyrtus medius* Schaeffer, 1896
5. *Lepidocyrtus caudatus* Carpenter, 1917
6. *Sinella curviseta* Borner, 1906
7. *Seira indica* (Ritter, 1911)

Subfamily: Paronellinae

8. *Yosiia dehradunia* Mitra, 1967
9. *Salina indica* (Imms, 1912)
10. *Dicranocentroides flavescens* Yosii, 1966

Family: Isotomidae

11. *Cryptopygus thermophilus* Axelson, 1900

Acknowledgement: I am grateful to the Director-in-charge, Dr. Ramakrishna, Zoological Survey of India, Kolkata, for providing laboratory facility. I am also thankful to Dr. A.K. Hazra, former Addl. Director, for helping in the collection of material and encouragement.

Reference

Christiansen, K.A. & Bellinger, P. 1980. *The Collembola of North America, North of the Rio Grande. A Taxonomic Analysis.* Grrinnell College, Grinnel, Iowa - 50112; (Parts I-IV): iii + 1322 pp.

DRUGS – Scourge of North-East India

Petrol and dendrite, it appears, are the stepping stones to drug addiction in the North-east India. Studies have revealed that addiction in the region almost follows the academic cycle. Schoolchildren begin with sniffing petrol and dendrite, advance to cannabis, heroin and smack–narcotic adultterated with rat poison and barbiturates–in colleges before graduating to prescription of pharmaceutical drugs injected through the veins.

According to a report by the Shillong-based United Nations Office on Drugs and Crime (UNODC), over 50 per cent of an estimated one lakh drug addicts are intravenous drug users (IDU). Most addicts, however, start early in life, in schools sniffing hankies drenched in petrol or inhaling heated dendrite. "Petrol and dendrite give a high, but they damage the sensory organs while laying the foundation for higher degrees of drug abuse," said Deepak Sahney, Counselor for de-addiction and HIV-AIDS.

By the time addicts are in colleges or in their late teens, they are hooked to cannabis. Manipur and Arunachal Pradesh are major growers of ganja as is Bhutan–heroin and smack. In areas bordering Myanmar, many take to amphetamines.

However, tighter vigil on traditional drug routes and high cost of procurement has seen a shift from heroin to Phensedyl like pharmaceutical drugs. The UNODC study says addicts in their 20s are usually IDUs while anti-drug NGOs claim the problem, mostly among dropouts, "lies more with abuse of pharmaceutical intoxicants" than narcotic substances.

"Most IDUs go for painkillers like Nitrocyn and Spasmo-Proxyvon that are meant to be taken orally," said Rabiul Islam, project director of Kripa Foundation, which opened its R&D center on addiction in Guwahati. "Our studies show that petrol abuse as well as the IDU menace is severe in small district towns and rural belts," Islam said.

Letters

Received *Bionotes* Vol. 9, No. 4, on 20th December. As usual it continues to be very nice in quality of contents, editing, printing and overall get up. Apart from research papers/notes, the general information on 'water' and 'Ganga jal' is also very interesting.

I have gone through one paper on 'Ameliorative effects of plant growth regulators in textile effluent treated groundnut, *Arachis hypogaea'*. The IAA and GA_3 have been reported to alleviate the adverse effect of textile effluent. As textile effluents may have adverse effect due to salinity, alkalinity and/or toxicity, it is not clear in the paper as to which factor/s out of three have been taken care of? I think this is to be identified so that specific role of IAA and GA_3 could be ascertained precisely.

-Dr. I.C. Gupta,
Secretary, Indian Society of Salinity Research Scientists
and Chief Editor *'Current Agriculture'*,
Jodhpur (RAJASTHAN).

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I received *Bionotes* Vol. 9, No. 3, on 5.9.2007. I saw the paper of Kamal Saini & Dr. H.S. Mehta. I feel it is not a good paper, because a senior scientist should not give wrong impression to the workers of Orthoptera. Most of the species are synonymised, the spellings of genera, species and authors are wrong. In some cases the author of species is wrong, e.g. *Velarifictorus lambai.* Bhowmik (not Shishodia) described it. Some of the species are wrongly listed, e.g. *Heteropternis partite* Walker, *Paraconophyma pcalra* (Wlk.), *Teleogryllus blennus* (Serv.), *Gryllus maculatus* Chopard. These species are either wrong or discussed under other genera.

The whole paper needs revision. Ninety five percent of species, genera and authors (name) need corrections. More than 12 species are synonymised and 4-5 species are wrongly typed. I am not aware of one species of Tettigoniidae (sl.no. 138).

Sequence of species, i.e. arrangement of species is also wrong–there is a species of Acridinae, then Gomphocerinae, again Acridinae, then Oedipodinae, again Acridinae, and so on. They have also committed mistakes in (using the) brackets on authors.

Regarding the References, many papers are left, while others included which are not related.

In short, there are only 122 species distributed under 80 genera (based on Dr. Mehta's paper). I have already prepared a list of 160-2 species, with more species included from H.P. which Dr. Mehta has not. I am having a chart of species district-wise of Himachal Pradesh, which I think Dr. Mehta also possesses.

-Dr. M.S. Shishodia,
Salarpur Kalan, Dadri (U.P.).

• • •

Thank you very much for a copy of the book "Bharat Ki Titliyan". Congratulations on fulfilling a long felt need in a most satisfactory way! I have taken the liberty of showing the book to schools and libraries, so that they know that such a book is available. They were most interested.

May I make two suggestions for the next edition of the book? The first is, why not create trivial names of butterflies in Hindi? The second is, in treating the taxon *Neptis miah varshneyi,* the names have unfortunately got interchanged in the illustration, so that the illustration of *varshneyi* has been labled *miah* while *miah* has been labeled *varshneyi !* Perhaps this small error could be rectified? Further going through your book, I noticed that the photograph of *Cethosia biblis* is in fact a photo of *Cethosia cyane.* Perhaps this could be rectified in your next edition.

Please keep up the good work and do similar books on moths, beetles, dragonflies, flies and bugs. It will go a long way in instilling a scientific temperament among north Indian youth.

-Peter Smetacek,
Bhimtal, Nainital (UTTARAKHAND).

• • •

While discussing with a Botanist from Hungary, Dr. Jozsef Racsko, a small lacuna was pointed out in the affiliation and complete postal address in papers published in *Bionotes.* "India" should be mentioned, because foreign scientists also may use it. I hope henceforth you will keep "India" (in the address, so that may) be used outside India.

-Dr. Sushil Pradhan ,
P.O. Sonepur,
Distt. Subarnapur (ORISSA).

• • •

Please find enclosed herewith a demand draft for Rs. 400/- drawn in favour of "A Biologists Confrerie", Aligarh, towards the subscription of the Newsletter "Bionotes Vol. 10, 2008".

Please acknowledge the receipt of the demand draft and send the stamped receipt at the earliest.

-G.V.S. Murthy,
Joint Director,
Botanical Survey of India,
Southern Circle,
Coimbatore (TAMIL NADU).

• • •

In Memoriam

F. C. FRASER
(1880-1963)

Lt. Col. Dr. Frederick Charles Fraser, the world renouned odonatologist and truely called 'The Father of Indian Odonatology', was born at Woolwich on February 15th, 1880. He was educated at Colle's school and afterwards entered Guy's Hospital as a medical student. He obtained M.R.C.S. and L.R.C.P. in 1903 and the M.D. (Brux.) in 1904. He married Ethel Grace Varall in 1905. He then took to general practice in London but only two years later he joined the Indian Medical Service. During his long stay in India he was stationed in many different places in high positions including Professor of Surgery at Vizagapatam Medical College and Professor and Lecturer in Obstetrics and Gynaecology at Madras University Medical School. His love for dragonflies bloomed soon after he arrived India and when he was stationed in the Nilgiri Hills, south of Mysore, a veritable paradise for the entomologist, he lost no opportunity to investigate the countless undescribed damsel and dragonflies, subsequently described serially for many years in the *Journal of the Bombay Natural History Society.* Though a Medical Surgeon of a high military rank, who would normally spend all his time of the day in executing various medical duties, Dr. Fraser would not let any opportunity of studying his favourite insects, the Odonata, slip away. Compilation of the three volumes of *Odonata* published in the *'Fauna of British India'* series (1933, 1934 and 1936) was the culmination of the highest quality of his research work. In these volumes Dr. Fraser has given odonatologists a thorough monograph of the dragonflies of one of the richest faunal areas of the tropical and subtropical world. In the Indian Sub-continent it is so far the only reference work, dealing with 537 species, available in all studies of palaeotropical dragonflies. He retired from the Indian Medical Service in 1933 and went back to England to live in Bournemouth.

In England Dr. Fraser joined the Society for British Entomology, in whose *Transactions* he made a number of valuable contributions. He became President of the Society in 1947. He wrote several monographs which had provided tremendous stimulus for future research. He was responsible for the Royal Entomological Society of London's *Handbooks* dealing with Odonata, Mecoptera, Megaloptera and Neuroptera and, more particularly, the accomplishment of an originally collaborative Tillyard-Fraser monographic treatise– *A Reclassification of the Order Odonata.* He was also an Honorary Fellow of the Royal Entomological Society of London. A gifted artist, he profusely illustrated his papers. He also had coloured some of his drawings for giving them a true resemblance with the natural insects. He had some interest in printing too.

Col. Dr. Fraser was a highly disciplined person. A world authority on dragonflies, he used to receive dragonfly collections for identification etc. from all over the world. Following the death of his wife in 1960, he continued to live by himself but never really alone, for his life-long interest in Entomology kept him more than busy. His relaxation and excercise was the hunting of dragonflies and he had stated that it was his ambition to describe one species each evening! With a solid military background of keeping himself fit physically and mentally, he would rise at an early hour and go on working at his papers on Odonata until late in the evening. For him the value of time was highly respected.

Dr. Fraser died suddenly on March 2nd, 1963, after attending a dinner party in the New Forest. His death created a certain void in the world of odonatological research and his works of very high standard would always remind him to the coming generations of odonatologists. His dragonfly collections are today present in British Museum (Natural History), while his library, one of the most complete and exhaustive one then in existence, is now in the Manchester University Museum. Presently, as the only world-wide odonatological society, the S.I.O. has the rare access to all of Dr. Fraser's odonatological works.

In addition to his general work on the phylogeny and classification of the Order, in his taxonomic works he touched upon all faunal regions, and his regional monographs on the fauna of India, Australasia, Africa and South America are much more than merely an indispensable basis for subsequent research. His odonatological oeuvre consists of over 300 papers and treatises, scattered in periodicals of all continents. A complete bibliography has never been published, and many of his papers are not readily available outside the largest specialized libraries.

Additional Obituary & Bibliography by: S.C.S. Brown, 1963. *Ent. mon. Mag.,* 99: 96, pl. 3; C.H. Kennedy, 1937. *Ann. Ent. Soc. Am.,* 30: 194-195; B. E. Montgomery, 1988. *SIO rapid comm. (suppl.),* No. 7.

– B.K. Tyagi

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